

Service Manual

Cassette Deck

RS-B78R

 (Silver Face)
(Black Face)

dbx/Dolby B-C NR, Auto-Reverse
Cassette Deck

 This is the Service Manual
for the following areas.

D ...For all European
areas except United
Kingdom.

B ...For United Kingdom.

N ...For Asia, Latin
America, Middle
East and Africa
areas.

A ...For Australia.

RS-8R MECHANISM SERIES

Specifications

Track system: 4-track 2-channel stereo recording and playback

Tape speed: 4.8cm/s

Wow and flutter: 0.045% (WRMS), $\pm 0.14\%$ (DIN)

Frequency response: Metal tape; 20~20,000Hz
30~19,000Hz (DIN)
40~18,000Hz ± 3 dB
CrO₂ tape; 20~19,000Hz
30~18,000Hz (DIN)
40~17,000Hz ± 3 dB
Normal tape; 20~18,000Hz
30~17,000Hz (DIN)
40~16,000Hz ± 3 dB

Dynamic range: 110dB (at 1kHz) with dbx in

Max. input level improvement: 10dB or more improved with dbx in (at 1kHz)

Signal-to-noise ratio: dbx in; 92dB (A weighted)
Dolby C NR in; 75dB (CCIR)
Dolby B NR in; 68dB (CCIR)
NR out; 58dB (A weighted)
(Signal level = max. input level CrO₂ type tape)

Fast forward and rewind time: Approx. 90 seconds with C-60 cassette tape

Inputs: MIC; sensitivity 0.25mV, applicable microphone impedance 400 Ω ~10k Ω
LINE; sensitivity 60mV, input impedance 47k Ω or more

Outputs: LINE; output level 700mV, output impedance 800 Ω or less
HEADPHONES; output level 125mV (at 8 Ω) applicable headphone impedance 8 Ω ~600 Ω

Bias frequency: 80kHz

Heads: 1-AX (AMORPHOUS) head for rec/playback
2-double-gap ferrite head for erasure

Motor: 3-motor system
One for capstan drive (Electrical governor motor)
One for reeltable drive (DC motor)
One for mechanism drive (DC motor)

Technics

 Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Power

requirements: AC; 110/125/220/240V, 50-60Hz

□...Pre-set power voltage 220V

□N□A...Pre-set power voltage 240V

Power

consumption: 25W

Dimensions: 43cm(W)×9.8cm(H)×27.3cm(D)

Weight: 5.3kg

Design and specifications are subject to change without notice.

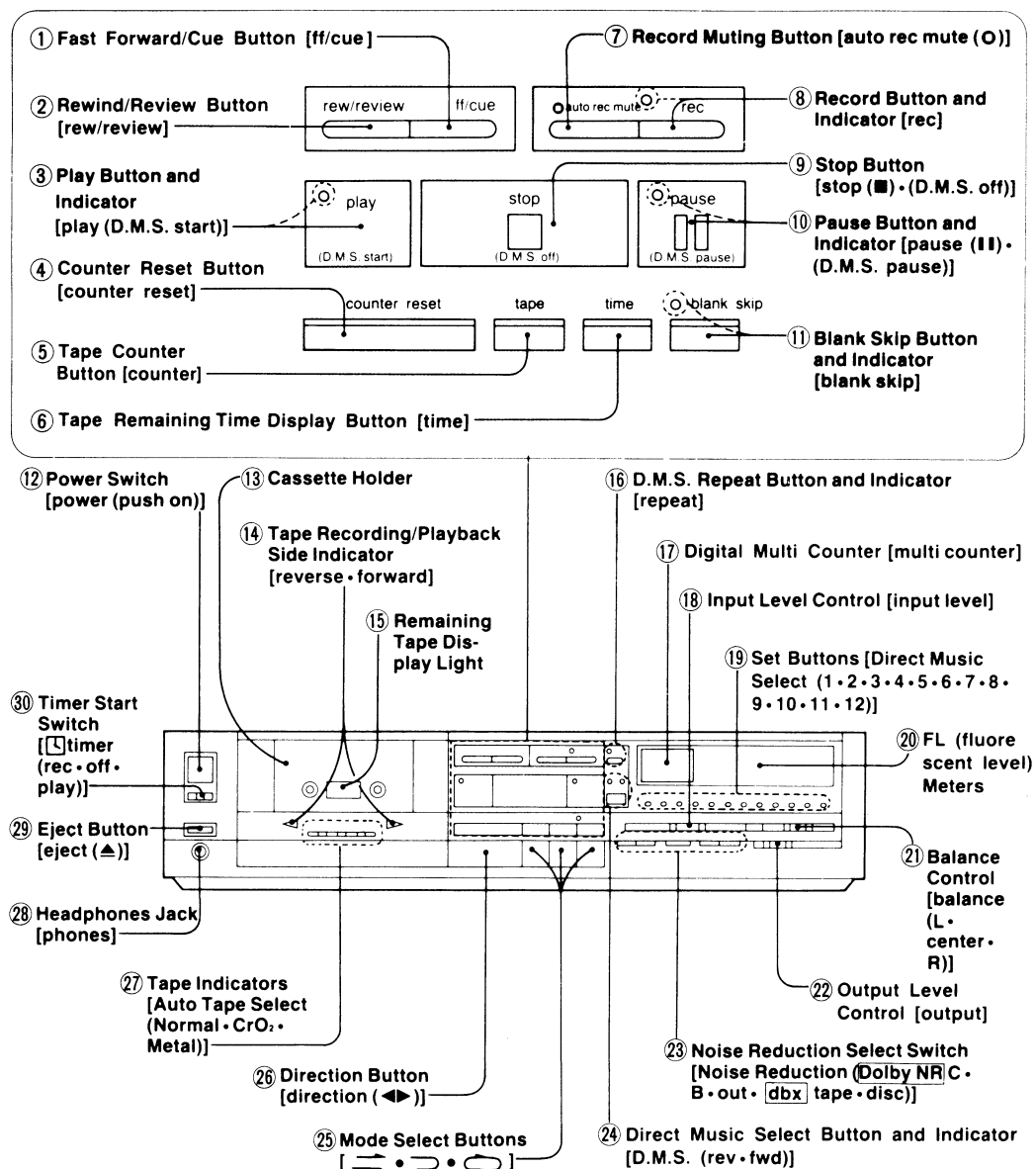
*The term dbx is a registered trademark of dbx Inc.

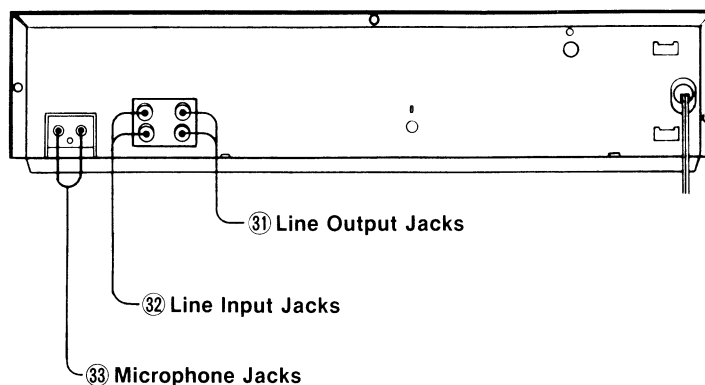
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LOCATION OF CONTROLS AND COMPONENTS





OPERATING INSTRUCTION

About direct music select function

After searching for the beginning of your desired programs, the unit will begin playback automatically.

1. Select the playback side

Each time the Direct Music Select Button is pressed, the unit will switch between forward and reverse playback. (The Forward or Reverse Indicator will light in the respective modes).

2. Select the programs

Press the Set Buttons of the programs you wish to hear (the buttons pressed will light).

- Programs are always counted from the beginning of the tape, first program, second program...etc.
- If the first program is set, the tape will automatically rewind to the beginning and enter the stop mode.
- If a button is pressed by mistake, pressing it once more will release it (its light goes out).

To listen to the 5th, 9th, and 2nd programs from the tape's beginning:

Press Set Button 5, 9, and 2 in that order.

To listen to set programs repeatedly:

If the D.M.S. Repeat Button is pressed, the set programs will be played back repeatedly (the D.M.S. Repeat Indicator will light, indicating that the D.M.S. repeat function is operating).

3. Begin playback

When the Play Button is pressed, the set programs will begin playback. (Programs not set will be skipped over automatically by the fast forward and rewind functions).

To cancel direct music select:

Press the Stop Button.

To cancel D.M.S. repeat:

Press the D.M.S. Repeat Button once again (the D.M.S. Repeat Indicator goes out).

Notes:

- During D.M.S. repeat playback, the unit will playback repeatedly a maximum of 16 times unless the Stop Button is pressed earlier.
- Playback in the direct music select mode is in the order in which the Set Buttons are pressed.
- Use the cassette tape's index card to note the names and order of programs recorded; this makes use of the Set Buttons more convenient.
- This may not operate correctly with the following kinds of tape: programs with passages of extremely low volume level, music tapes with non-recorded passages, recordings with sections of fade-in or fade-out recording.
- Unrecorded blanks of about 4 seconds in length between the program must be created in order for the music selector function to work properly.
The function may not work if the blanks are too short.
The function may not work properly with prerecorded music tapes which have passages where the sound level is particularly low or which have passage of unrecorded sound.
- In cases such as classic music, when a low level of sound continues in the program.
- Do not use pause between music pieces during D.M.S. operation. (This may cause erroneous operation for counting of the number of music pieces.)
- On a music tape to be played back with direct music select, there has to be an unrecorded space of at least four seconds between the end of the last tune on the tape and the beginning of the leader tape; if there is not, an operational error may occur.
- Additional settings of song numbers not yet used can be made while D.M.S. playback is in progress.
However, numbers of songs already played-back by D.M.S. should not be re-entered during D.M.S. playback because the next D.M.S. song number will be cancelled each time the select key of a previously played song is pressed.
- Do not cancel D.M.S. playback during about the first 8 seconds of a song to prevent an erroneous operation when D.M.S. playback is used again.
- Check the total number of songs on a cassette before entering song numbers for D.M.S. playback.
If a non-existent song number is entered (for example, song 6 for a cassette side having only 5 songs), the D.M.S. function may not operate properly.
If this occurs, press the stop Button.

DISASSEMBLY INSTRUCTIONS

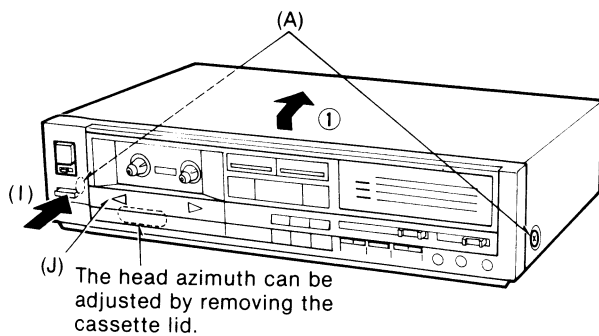


Fig. 1

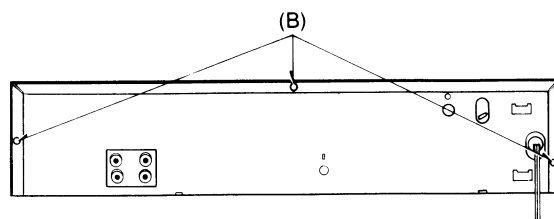


Fig. 2

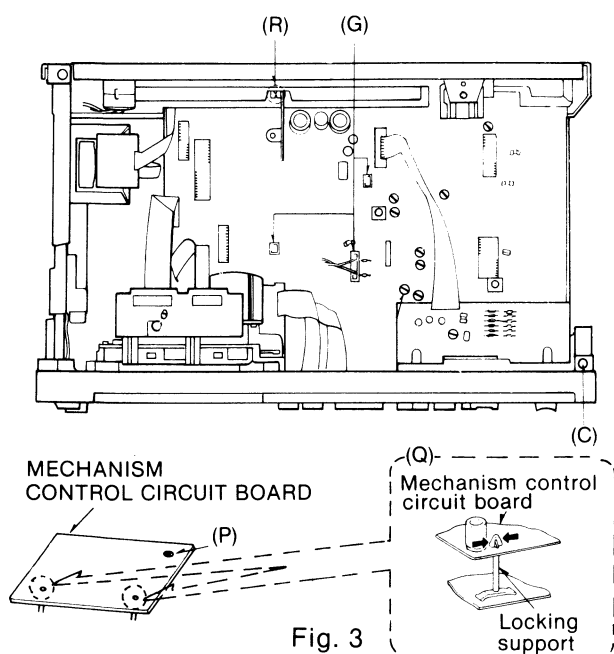
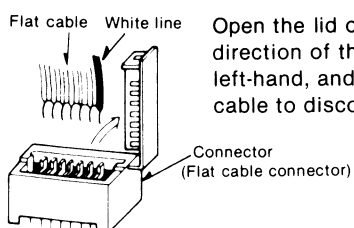


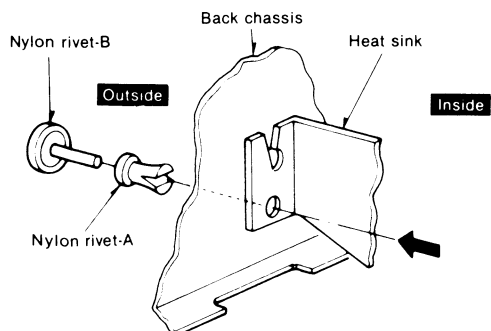
Fig. 3

(H) How to remove flat cable



Open the lid of connector in the direction of the arrow as shown left-hand, and extract the flat cable to disconnect.

(R) How to remove nylon rivet



To remove a heat sink from the back chassis, first press nylon rivet-A from the inside in the direction indicated by the arrow as shown above, and extract the rivet to the outside. Next remove nylon rivet-B from the outside. Consequently, the heat sink can be removed from the back chassis.

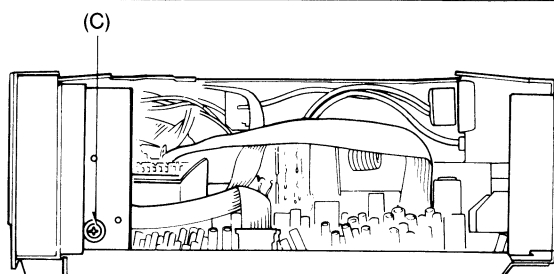


Fig. 4

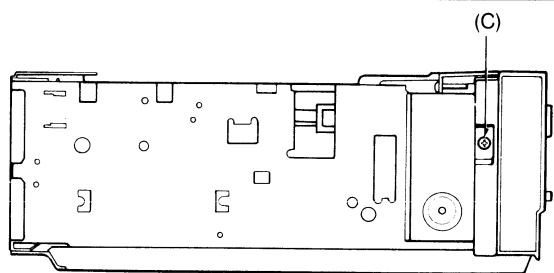


Fig. 5

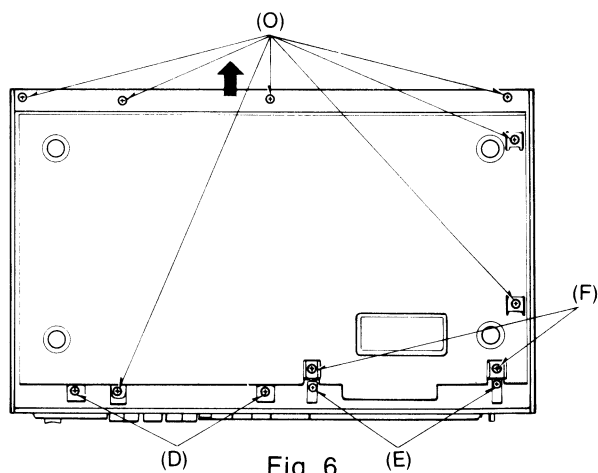


Fig. 6

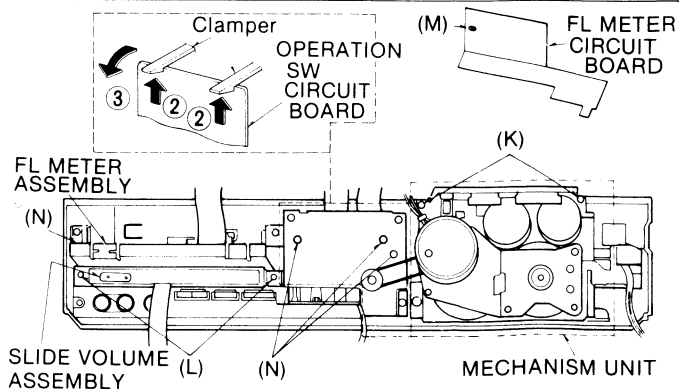


Fig. 7

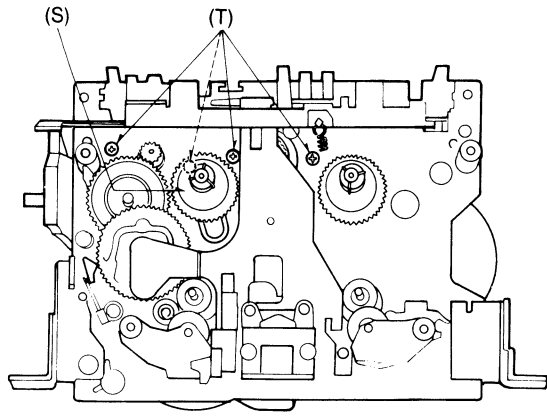


Fig. 8

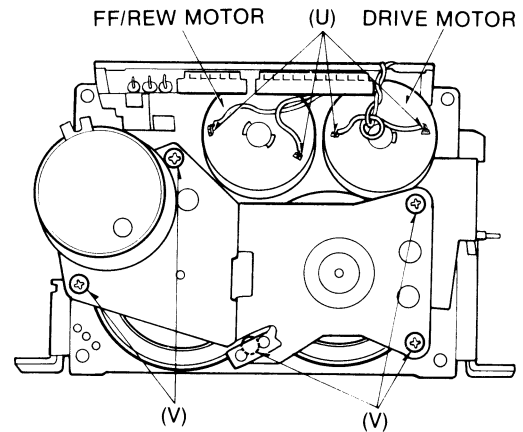


Fig. 9

Ref. No.	Procedure	To remove —.	Remove —.	Shown in fig. —.
1	1	Case cover	<ul style="list-style-type: none"> • 2 ornament screws(A) • 3 screws(B) • As shown in fig. 1, pull case cover in the direction of arrow ①. 	1 2 1
2	1 → 2	Front panel assembly and mechanism unit	<ul style="list-style-type: none"> • 3 screws(C) • 2 screws(D) • 2 screws(E) • 2 screws(F) • Pull out the connectors A B F G H N O P Q R W 1(G) • How to remove flat cable(H) 	3, 4, 5 6 6 6 3 3
3	1 → 3	Mechanism unit	<ul style="list-style-type: none"> • Push the eject button(I) • Cassette lid(J) • 2 screws(E) • 2 screws(F) • 2 screws(K) 	1 1 6 6 7
4	1 → 4	Slide volume assembly	<ul style="list-style-type: none"> • 2 screws(L) 	7
5	1 → 4 → 5	FL meter circuit	<ul style="list-style-type: none"> • 1 screw(M) • 4 screws(N) • As shown in fig. 7, raise the clumper in the direction of arrow ② and remove the FL meter circuit in the direction of arrow ③. 	7 7 7
6	6	Bottom cover	<ul style="list-style-type: none"> • 2 screws(D) • 2 screws(F) • 7 screws(O) • Slide the bottom cover in the direction arrow ④ and remove it. 	6 6 6 6
7	1 → 6 → 7	Mechanism control circuit board	<ul style="list-style-type: none"> • 1 screw(C) • 1 screw(P) • How to remove flat cable(H) • Remove the locking support from the board while pushing its tip in the direction of arrow.(Q) 	4 3 3 3
8	1 → 6 → 7 → 8	Main circuit board	<ul style="list-style-type: none"> • How to remove nylon ribet(R) 	3
9	1 → 3 → 9	FF/REW motor and driver motor	<ul style="list-style-type: none"> • Remove the reel table(S) • 4 screws(T) • Un solder the soldered portion of the FF/REW motor terminal and driver motor terminal(U) 	8 8 9
10	1 → 3 → 10	Capstan motor	<ul style="list-style-type: none"> • 5 screws(V) 	9

PRECAUTIONS IN DISASSEMBLY AND REASSEMBLY

Removing the Mode Select Button

The Mode Select Buttons are press-fit with the Button Bushings, as shown in Fig. 10, with the Front Panel Assembly and Button Springs between them. Remove the Button Bushings using pliers to disassemble these parts. Be careful not to lose the Button Springs as they will pop out.

Reassembling the Mechanism Unit

1. For repair, measurement or adjustment with the mechanism removed from the unit be sure to ground the lower base plate of the mechanism.

For grounding, connect an extension cord to the mechanism's lower base plate and the lug terminal from amplifier printed circuit board.

Without grounding, the mechanism does not operate properly. (Refer to Fig. 11).

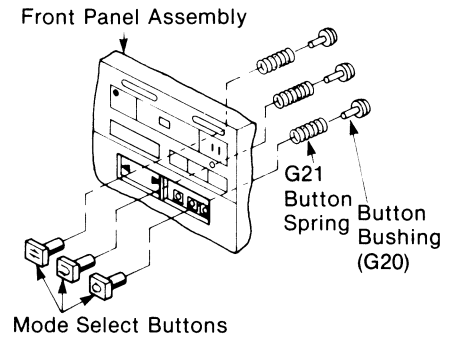


Fig. 10

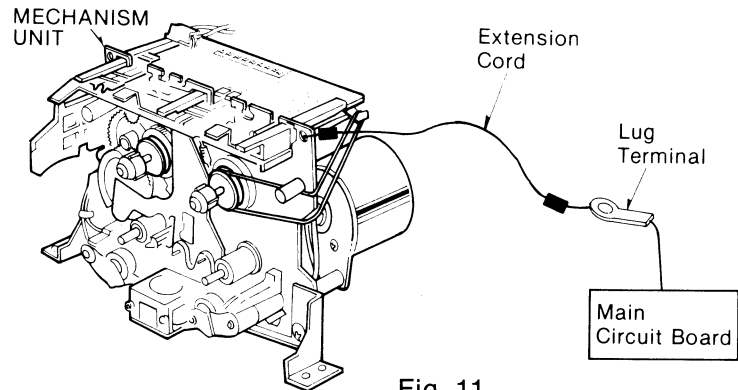


Fig. 11

PRECAUTIONS FOR PARTS REPLACEMENT

Replacement of the Blank Skip/Time/Tape, Counter Reset and DMS (1—12) Buttons.

The Blank Skip, Time Count and Tape Count Buttons are a one-piece resin molded part (It is supplied as a single part.).

As shown in Fig. 1, this buttons are fixed in such a manner that the Front Panel Assembly is sandwiched between the Ornament Plate (G5-1) and the buttons and five pins (A) are melted by heat. (Five pins (B) are used to fix the Ornament Plate. Refer to Fig. 2.)

To remove this part, first, remove the two lugs on the Ornament Plate from the Front Panel. Then, while pulling part (C) of the Ornament Plate toward the front, heat the ten pins (A) and (B) with a soldering iron. (Refer to the Fig. 2.) When the button retainer plate is removed at this time, buttons DMS 1 to 12 can be replaced.

As mentioned above, this part is fixed by melting the pins by heat, both the Ornament Plate and button must be replaced when replacement is required.

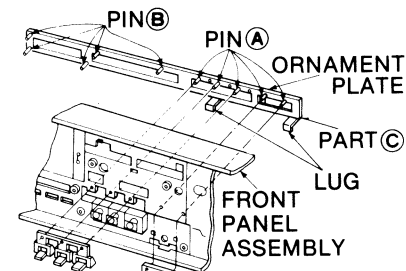
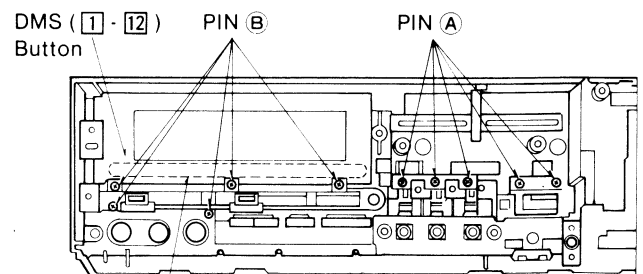


Fig. 1



Button Retainer Plate Fig. 2

Replacement of Parts on the Keyboard Circuit

To replace the parts on the keyboard circuit, first, remove the eight screws (F), and then desolder two terminals (G) of LED's (D519). The Operation Chassis can then be removed from the Base Plate and the parts be replaced. (Refer to Fig. 3).

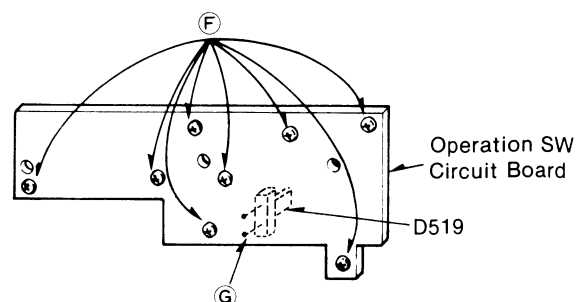


Fig. 3

REPLACING ROTARY HEAD ASSEMBLY

Considerations in mounting the rotary head assembly

1. This recorder requires a record/playback head of extremely precise head height. In replacing the rotary head, install a factory-adjusted full rotary head assembly.
[Never attempt to disassemble the rotary head assembly by removing screws (A).]
2. In installing the replacement rotary head assembly, make certain that the change gear is placed at location (B) on the change rod. (See Fig. 1.)
3. Trace the record/playback head lead-wire as follows (Refer to Fig. 2):
 - Set the record/playback head in its forward stop direction.
 - At this time, hook the head wire to the clamber of the pinch roller R, and press the head wire in the direction of the arrow as shown in Fig. 2 so that it is bent approximately 90 degrees. Then secure the wire on the mechanism unit using a cord clamber.

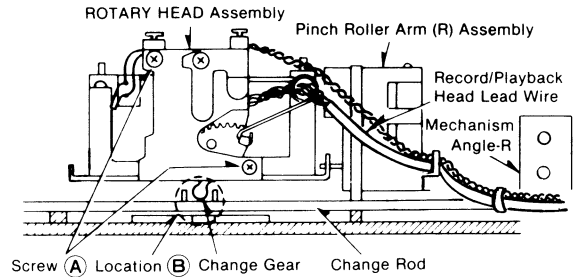


Fig. 1

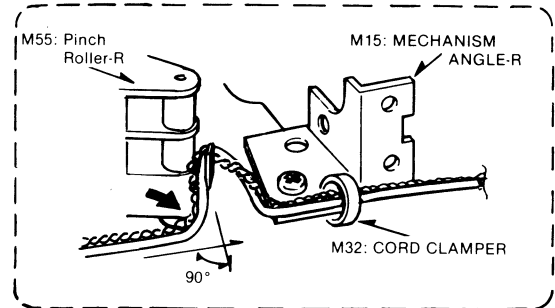


Fig. 2

MEASUREMENT AND ADJUSTMENT METHODS

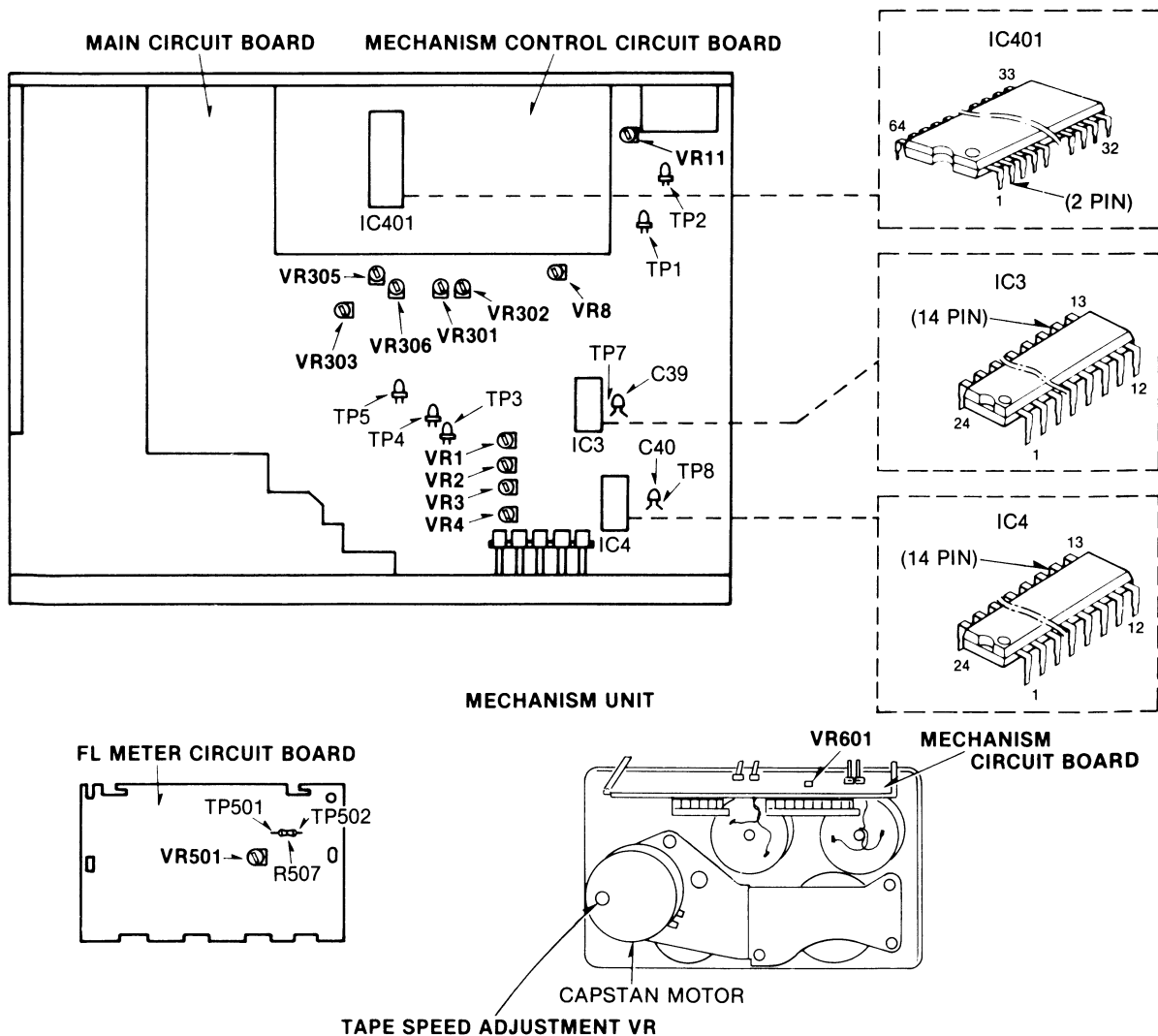


Fig. 1

NOTES: Set switches and controls in the following positions, unless otherwise specified.

- Make sure heads are clean
- Make sure capstan and pressure roller are clean
- Judgeable room temperature $20 \pm 5^\circ\text{C}$ ($68 \pm 9^\circ\text{F}$)
- NR switch: OUT
- Timer start switch: OFF
- Balance control: Center
- Input level control: Maximum
- Output level control: Maximum
- Mode switch: mode
- Blank skip switch: OFF
- Music select switch: OFF
- Music repeat switch: OFF

A Head adjustment

Condition:

- Playback mode
- (Forward • Reverse)
- Normal tape mode

Equipment:

- VTVM
- Oscilloscope
- Test tape (azimuth)...QZZCFM
- Test tapeQZZCRD

HEAD HEIGHT ADJUSTMENT

1. Turn the erase head height adjustment screws on the rotary head assembly counterclockwise until the upper end face of the erase heads is aligned on the same plane as the top face of their respective guide pins. (Refer to figs. 2 and 3.)
2. Put a point ink-mark on the head of each adjustment screw.
3. With the marks as guides, turn the erase head height adjustment screw 3.2 turns clockwise.
4. Install a test tape (tape with mirror: QZZCRD) on the recorder; place the recorder in the FORWARD PLAY mode. Make fine adjustments of the erase head height as necessary, to attain on the record/playback head face the tape position shown in fig. 4.
5. Run the tape in the forward play mode and check it for zigzag running. (Shown in fig. 4) If zigzag tape running occurs, repeat step 4.
6. Place the recorder in the reverse play mode and perform the above steps 4 and 5.
7. Repeat steps 5 and 6 two or three times and verify that the tape position shown in fig. 4 is ensured.

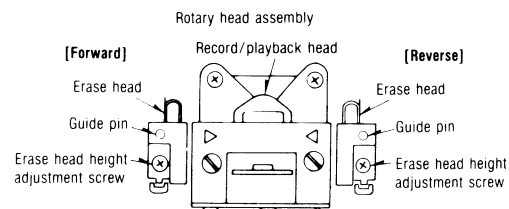


Fig. 2

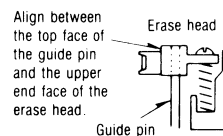


Fig. 3

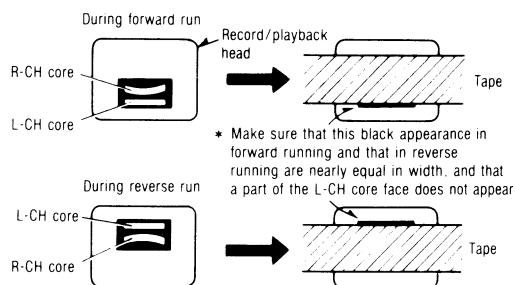


Fig. 4

L-CH/R-CH output balance adjustment

8. Make connections as shown in fig. 5.
9. In the forward playback mode, playback the 8kHz signal from the test tape (QZZCFM). Adjust the azimuth screw (Forward) shown in fig. 6 for maximum output L-CH and R-CH levels. When the output levels of L-CH and R-CH are not at maximum at the same point adjust as follows.
10. Turn the azimuth screw (Forward) shown in fig. 6 to find angles A and C (points where peak output levels for left and right channels are obtained). Then, locate angle B between angles A and C, i.e., point where L-CH and R-CH outputs are balanced. (Refer to figs. 6 and 7.)
11. In the reverse playback mode, adjust the azimuth screw (reverse) in the same way described above.

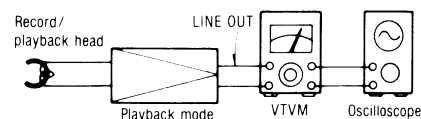


Fig. 5

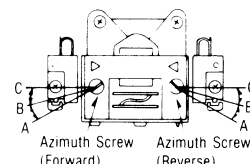


Fig. 6

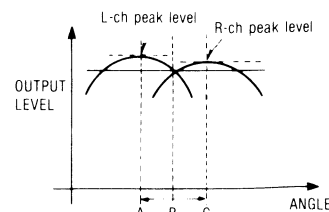


Fig. 7

L-CH/R-CH phase adjustment

12. Make connections as shown in fig. 8.
13. In the forward playback mode, playback the 8kHz signal from the test tape (QZZCFM). Adjust the azimuth screw (Forward) shown in fig. 6 so that pointers of the two VTVMs swing to maximum and a lissajous waveform as illustrated in fig. 9 is obtained on the oscilloscope.
14. In the reverse playback mode, adjust the azimuth screw (reverse) in the same way described above.

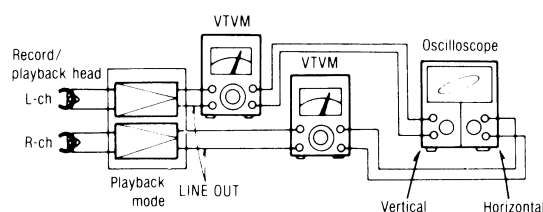


Fig. 8

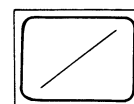


Fig. 9

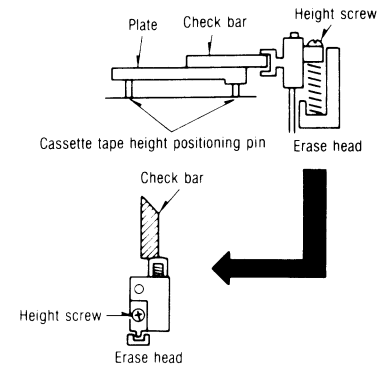
Checking the difference in level between forward and reverse running

15. Reproduce the playback level adjustment signal (315 Hz at 0 dB) on the standard playback adjustment tape; and check that the difference between the level in forward running and that in reverse running is within 1.0 dB.
16. After adjustment, lock the erase head height and angle adjustment screws.

Head Height Adjustment using the Head Adjustment Jig (QZZ0207)

The head adjustment jig (QZZ0207) enables accurate, speedy head height adjustment in the following manner.

- a. Place the plate onto the mechanism.
- b. Set the mechanism to the PLAY mode.
- c. Place the check bar onto the plate.
- d. Pass the check bar through each erase head.
- e. Adjust the height screw so that the check bar does not touch any of the erase heads.
- f. Run a mirror tape (QZZCRD) and check to see that the tape does not touch (twist around, etc.) the erase heads.
- g. After that, adjust items 4 thru 13 in the adjustment procedure.

**㊦ Takeup torque**

Condition:
• Playback mode

Equipment:
• DC voltmeter
• Test tape...QZZSRKCT

1. Set the test tape (or RT-60) into the cassette holder.
2. Adjust the takeup torque adjusting potentiometer VR601 in the forward playback mode for 3.5 volts between the FF/REW motor terminals.
3. Run the QZZSRKCT takeup torque measurement tape in the forward playback mode and check that the torque is within quoted tolerance.

Standard value: 50 ± 10 gr-cm

㊦ Tape speed

Condition:
• Playback mode

Equipment:
• Digital frequency counter
• Test tape...QZZCWAT

Tape speed accuracy

1. Test equipment connection is shown in fig. 10.
2. Playback test tape (QZZCWAT 3,000 Hz), and supply playback signal to the digital frequency counter.
3. Measure this frequency.
4. On the basis of 3,000 Hz, determine value by following formula:

$$\text{Tape speed accuracy} = \frac{f - 3,000}{3,000} \times 100(\%) \quad \text{where, } f = \text{measured value}$$

5. Take measurement at middle section of tape.

Standard value: ± 1.5%

6. If measured value is not within the standard value, adjust it by using the tape speed adjustment VR shown in Fig. 1.

Tape speed fluctuation

Make measurements in same manner as above (beginning, middle and end of tape), and determine the difference between maximum and minimum values and calculate as follows:

$$\text{Tape speed fluctuation} = \frac{f_1 - f_2}{3,000} \times 100(\%) \quad f_1 = \text{maximum value, } f_2 = \text{minimum value}$$

Standard value: Less than 1%

NOTE:

Please use non metal type screwdriver when you adjust tape speed on this unit.

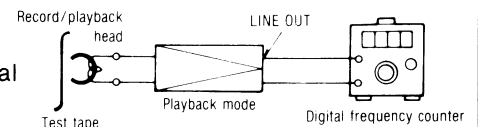


Fig. 10

D Playback frequency response

Condition:

- Playback mode (Forward • Reverse)
- Normal tape mode

Equipment:

- VTVM
- Oscilloscope
- Test tape...QZZCFM

1. Test equipment connection is shown in fig. 5.
2. Playback the frequency response portion of test tape (QZZCFM).
3. Measure output level at 315Hz, 12.5kHz, 8kHz, 4kHz, 1kHz, 250Hz, 125Hz and 63Hz, and compare each output level with the standard frequency 315Hz, at LINE OUT.
4. Make measurements for both channels.
5. Make sure that the measured values are within the range specified in the frequency response chart. (Shown in fig. 11).

Playback frequency response (Forward • Reverse)

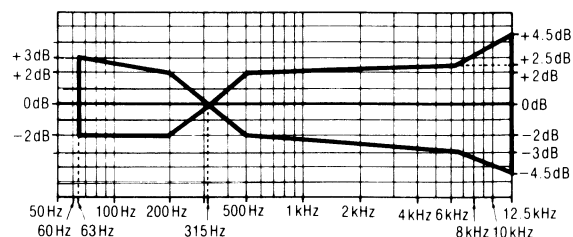


Fig. 11

E Playback gain

Condition:

- Playback mode
- Normal tape mode
- Output level control...MAX.
- Balance control...Center

Equipment:

- VTVM
- Oscilloscope
- Test tape...QZZCFM

1. Test equipment connection is shown in fig. 5.
2. Playback standard recording level portion on test tape (QZZCFM 315Hz) and, using VTVM, measure the output level at test points [TP7 (L-CH), TP8 (R-CH)].
3. Make measurements for both channels.

Standard value: $0.42 \pm 0.05V$ [around 0.28V: at test points TP7 (L-CH) and TP8 (R-CH)]

Adjustment

1. If the measured value is not within standard the adjust VR1 (L-CH) or VR2 (R-CH) (See fig. 1).
2. After adjustment, check "Playback frequency response" again.

F Erase current

Condition:

- Record mode (Forward • Reverse)
- Metal tape mode

Equipment:

- VTVM
- Oscilloscope

1. Test equipment connection is shown in fig. 12.
2. Place UNIT into metal tape mode.
3. Press the record and pause buttons.
4. Read voltage on VTVM and calculate erase current by following formula:

$$\text{Erase current (A)} = \frac{\text{Voltage across resistor R201}}{1 (\Omega)}$$

Standard value: $155 \pm 15mA$ (Metal)

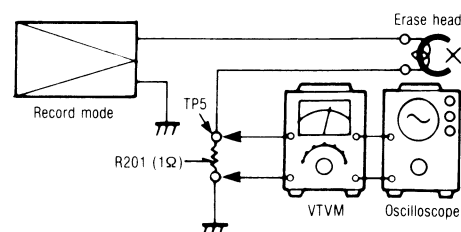


Fig. 12

Adjustment

- If the measured value is not within standard value, adjust VR305 (Forward) or VR306 (Reverse) (See fig. 1).

G Overall frequency response

Condition:

- Record/playback mode (Forward • Reverse)
- Normal tape mode
- CrO₂ tape mode
- Metal tape mode
- Input level control...MAX
- Output level control...MAX
- Balance control...Center

Equipment:

- VTVM
- ATT
- AF oscillator
- Oscilloscope
- Resistor (600Ω)
- Test tape (reference blank tape)
 - ...QZZCRA for Normal
 - ...QZZCRX for CrO₂
 - ...QZZCRZ for Metal

Note:

Before measuring and adjusting, the overall frequency response make sure of the playback frequency response (For the method of measurement, please refer to the playback frequency response).

(Recording equalizer is fixed)

1. Make connections as shown in fig. 13.
2. Place UNIT into normal tape mode and insert the normal reference blank test tape (QZZCRA).
3. Supply a 1kHz signal from the AF oscillator through ATT to LINE IN.
4. Adjust ATT so that input level is -20dB below standard recording level (standard recording level = 0 VU).
5. Adjust the AF oscillator frequency to 1kHz, 50Hz, 100Hz, 200Hz, 500Hz, 4kHz, 8kHz, 10kHz and 12.5kHz signals, and record these signals on the test tape.
6. Playback the signals recorded in step 5, and check if the frequency response curve is within the limits shown in the overall frequency response chart for normal tapes (fig. 14). (If the curve is within the charted specifications, proceed to steps 7, 8 and 9.)
If the curve is not within the charted specifications, adjust as follows;

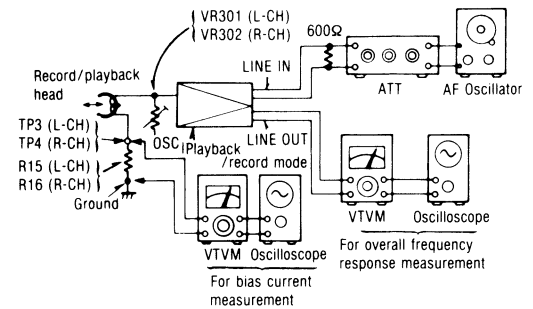


Fig. 13

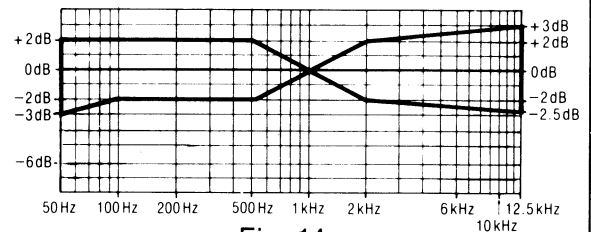
Overall frequency response chart (Normal)

Fig. 14

Adjustment (A):

When the curve exceeds the overall specified frequency response chart (fig. 14) as shown in fig. 15.

- 1) Increase bias current by turning VR301 (L-CH) and VR302 (R-CH). (See fig. 1 on page 7.)
- 2) Repeat steps 5 and 6 for confirmation (Proceed to steps 7, 8 and 9 if the curve is now within the charted specifications as shown fig. 14.)
- 3) If the curve still exceeds the specifications (fig. 14), increase bias current further and repeat steps 5 and 6.

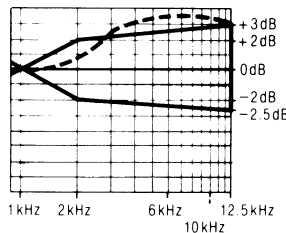


Fig. 15

Adjustment (B):

When the curve falls below the overall specified frequency response chart (fig. 14) as shown in fig. 16.

- 1) Reduce bias current by turning VR301 (L-CH) and VR302 (R-CH).
- 2) Repeat steps 5 and 6 for confirmation (Proceed to steps 7, 8 and 9 if the curve is now within the charted specification as shown fig. 14.)
- 3) If the curve still falls below the charted specifications (fig. 14), reduce bias current further and repeat steps 5 and 6.

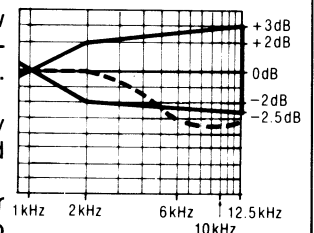


Fig. 16

7. Place UNIT into CrO₂ tape mode.
8. Change test tape to CrO₂ reference blank test tape (QZZCRX), and record 1kHz, 50Hz, 100Hz, 200Hz, 500Hz, 4kHz, 8kHz, 10kHz and 15kHz signals. Then, playback the signals and check if the curve is within the limits shown in the overall frequency response chart for CrO₂ tapes (fig. 17).
9. Place UNIT into metal tape mode and change test tape to metal reference blank test tape (QZZCRZ), and record 1kHz, 50Hz, 100Hz, 200Hz, 500Hz, 4kHz, 8kHz, 10kHz, 12.5kHz and 15kHz signals. Then, playback the signals and check if the curve is within the limits shown in the overall frequency response chart for metal tapes (fig. 17).
10. Confirm that bias currents are approximately as follows when the UNIT is set at different tape mode.
 - Read voltage on VTVM between ground and test point (TP3 for L-CH, TP4 for R-CH) and calculate bias current by following formula:

$$\text{Bias current (A)} = \frac{\text{Value read on VTVM (V)}}{10 (\Omega)}$$

around 200μA (Normal position)
Standard value: around 250μA (CrO₂ position)
around 430μA (Metal position)

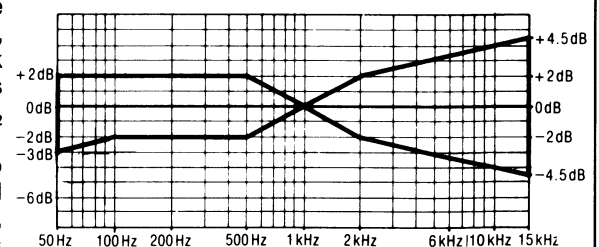
Overall frequency response chart (CrO₂, Metal)

Fig. 17

Ⓐ Overall gain

Condition:

- Record/playback mode (Forward • Reverse)
- Normal tape mode
- Input level control...MAX
- Output level control...MAX
- Balance control...Center
- Standard input level;

MIC $-72 \pm \frac{4}{2}$ dB

LINE IN $-24 \pm \frac{4}{2}$ dB

Equipment:

- VTVM
- ATT
- Resistor (600Ω)
- Test tape (reference blank tape) ...QZZCRA for Normal
- AF oscillator
- Oscilloscope

1. Test equipment connection is shown in fig. 18.
2. Insert the normal reference blank tape (QZZCRA).
3. Place UNIT into record mode.
4. Supply a 1kHz signal through ATT (-24dB) from AF oscillator, to LINE IN.
5. Adjust ATT until monitor level at LINE OUT becomes 0.42V.
6. Playback recorded tape, and make sure that the output level at LINE OUT becomes 0.42V.
7. If measured value is not $0.42V \pm 2$ dB, adjust it by using VR3 (L-CH) or VR4 (R-CH).
8. Repeat from step (2).

Standard value: $0.42V \pm 2$ dB

[around 0.28V: at test points TP7 (L-CH) and TP8 (R-CH)]

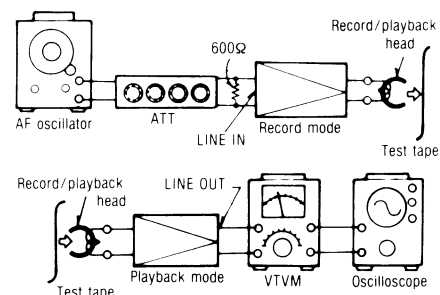


Fig. 18

Ⓑ Dolby NR circuit

Condition:

- Record mode
- Dolby NR switch...IN/OUT
- Dolby NR select switch...B/C
- Input level control...MAX
- Output level control...MAX
- Balance control...Center

Equipment:

- VTVM
- ATT
- Resistor (600Ω)
- AF oscillator
- Oscilloscope

Record side

• Check of the Dolby-B type encoder characteristics

1. Make connections as shown in fig. 19.
2. Set the unit to the record mode. (NR select switch is OUT.)
3. Apply a 1kHz signal to LINE IN.
4. Adjust the ATT so that the output level at TP7 (L-CH) and TP8 (R-CH) is 12.3mV.
5. The output level at pin 14 should also be 12.3mV. (Let 12.3mV = 0dB for this adjustment.)
6. Set the NR select switch to B, and make sure that the output signal level at pin 14 of IC3 (L-CH) and IC4 (R-CH) is $+6\text{dB} \pm 2.5\text{dB}$.
7. Set the NR select switch to OUT, and adjust the frequency to 5kHz. The output signal level at pin 14 should be 0dB.
8. Set the NR select switch to B and make sure that the output signal level at pin 14 of IC3 (L-CH) and IC4 (R-CH) is $+8\text{dB} \pm 2.5\text{dB}$.

• Check to Dolby-C type encoder characteristics

9. Repeat steps 1-5 above.
10. Set the NR select switch to C and make sure that the output signal level at pin 14 of IC3 (L-CH) and IC4 (R-CH) is $+11.5\text{dB} \pm 2.5\text{dB}$.
11. Set the NR select switch to OUT and adjust the frequency to 5kHz. The output signal at pin 14 should be 0dB.
12. Set the NR select switch to C and make sure that the output signal level at pin 14 of IC3 (L-CH) and IC4 (R-CH) is $+8.5\text{dB} \pm 2.5\text{dB}$.

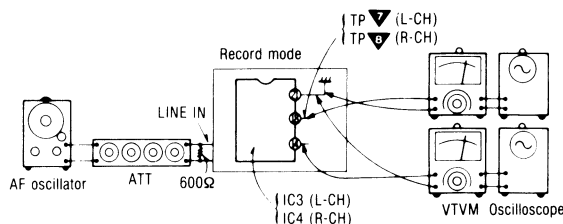


Fig. 19

⑨ Attack recovery time adjustment (dbx circuit)

Condition:
 • Record mode
 • Input level control...MAX
 • Noise reduction selector ...dbx tape

Equipment:
 • VTVM
 • ATT
 • AF oscillator
 • DC voltage

1. Make the connections as shown in fig. 20 and apply 1kHz -27dB signal from LINE IN, and set the noise reduction selector to dbx tape position.
2. Set the unit to record mode, adjust ATT so that the signal level at C107 (L-CH) and C108 (R-CH) is 300mV.
3. Read voltage on DC volt meter.

Reference value: $15 \pm 0.5\text{mV}$

4. If measured value is not within reference, adjust VR11 (shown in fig. 1).

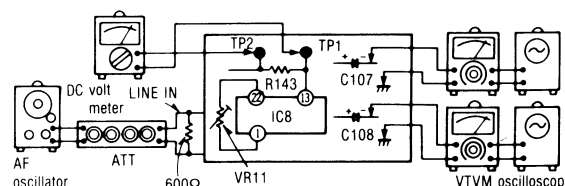


Fig. 20

⑩ Input scanning time adjustment

Condition:
 • Stop mode

Equipment:
 • Oscilloscope

1. Place the recorder in the stop mode.
2. Connect an oscilloscope to pin 2 of IC401, as shown in fig. 21.
3. Make sure that the measured values are within the reference value.

Reference value: Approx. 4.6msec.

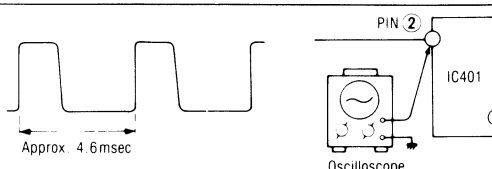


Fig. 21

⑪ Fluorescent meter

Condition:
 • Record mode
 • Input level controls...MAX

Equipment:
 • VTVM
 • ATT
 • AF oscillator

• Check for FL meter

To check the accuracy of the FL meter, measure the output level at test point [TP7 (L-CH), TP8 (R-CH)].

1. Make connections as shown (See fig. 22).
2. Connect a wire between TP501 and TP502 terminal (See fig. 23).
3. In the recording pause mode, apply 1kHz (-24dB) to LINE IN.
4. Adjust ATT so that output level at test point [TP7 (L-CH), TP8 (R-CH)] is 0.28V.

Checking FL meter 0dB segment display ON/OFF

Change the output level at test point [TP7 (L-CH), TP8 (R-CH)] from 0.28V -1dB ($\approx 250\text{mV}$) to 0.28V +1dB ($\approx 310\text{mV}$) by adjusting the attenuator, and check that the FL meter 0dB segment display OFF state changes to the ON state.

Checking FL meter -40dB segment display ON/OFF

Lower the signal level 28dB below the standard input level (-24dB-28dB=-52dB $\approx 2.5\text{mV}$) and then further lower the level 12dB (-52dB-12dB=-64dB $\approx 0.63\text{mV}$) by adjusting the attenuator. While lowering the level as described above, make sure that only the -40dB display remains lit the dims or goes off at the lowest level.

• Adjustment for FL meter

1. Make connections as shown (See fig. 22).
2. Connect a wire between TP501 and TP502 terminal (See fig. 23).
3. In the recording pause mode, apply 1kHz (-24dB) to LINE IN.
4. Adjust ATT so that output level at test point [TP7 (L-CH), TP8 (R-CH)] is 0.28V.

-40dB adjustment

5. Adjust ATT so that the level adjusted at step 4 is reduced by 40dB.
6. At this time, check that -40dB indicator is dimmed (intermediate brightness between full brightness and light-out: See fig. 24).
7. If the indicator is not lighted halfway as described in step 6, adjust VR8.

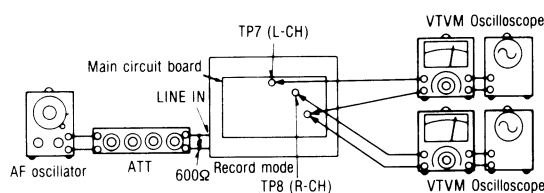


Fig. 22

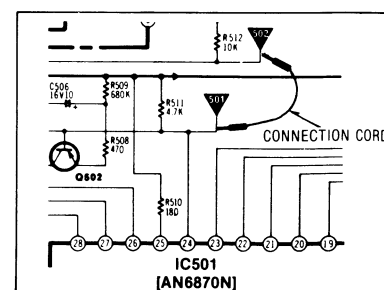


Fig. 23

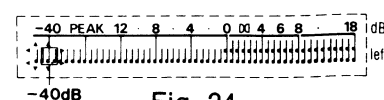


Fig. 24

0dB adjustment

8. Restore the condition of step 4 (set output level to 0.28V at test point [TP7 (L-CH), TP8 (R-CH)]).
9. At this time, check that 0dB indicator is dimmed (intermediate brightness between full brightness and light-out (See fig. 25).
10. If improper, adjust VR501.
11. Repeat adjustments at steps 4, 5, 6, 7, 8, 9 and 10 two or three times.
12. Disconnect the wire between TP501 and TP502 terminal, which had been connected at step 2.



Fig. 25

Photo sensor circuit

Condition:
• Playback mode

NOTE:

When adjusting the photo sensor circuit, leave the front panel, cassette lid and indication plate in place. (External light can cause the photo sensor in the cassette holder to malfunction and makes accurate adjustment impossible.)

Sensitivity adjustment

Some malfunctions, such as tape reverse or auto stop, may sometimes occur during tape travel according to type and make of tape. If the trouble is caused only by tape wrinkles, perform the following adjustments.

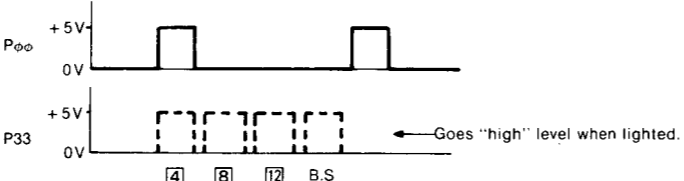
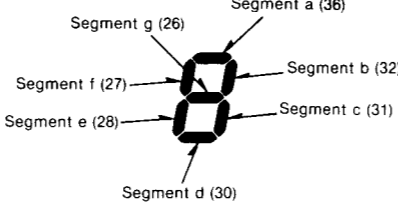
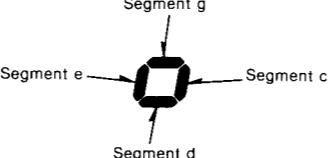
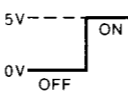
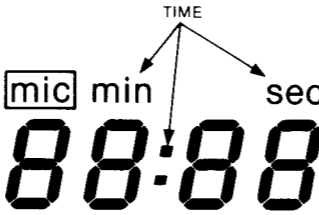
1. While playing the section causing malfunction, adjust VR303 so that normal operation is obtained. (Shown in fig. 1).
2. Then play the leader tape section and check for normal operation (that tape reverse and auto stop are eliminated).

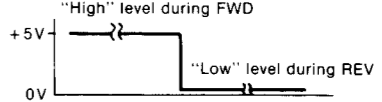
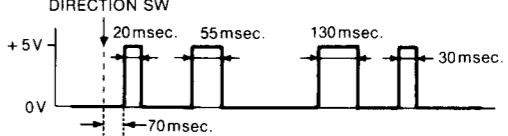
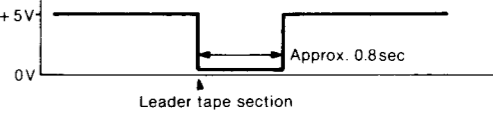
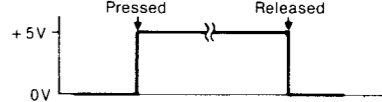
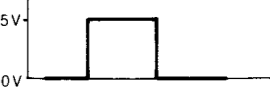

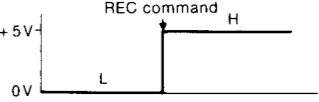
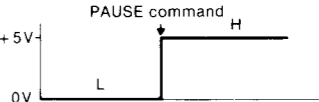
MICROCOMPUTER TERMINAL FUNCTION AND WAVEFORM (IC401: MN1564RME)

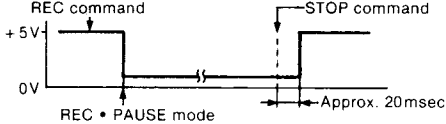
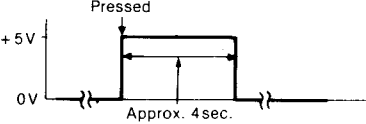
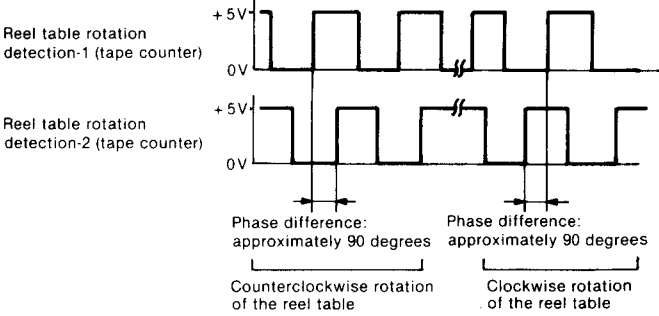
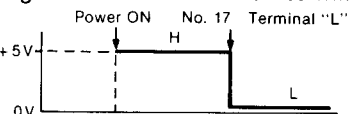
Terminal No.	Symbol	Name	Function/operation
1.	VSS	GND	
2.	$P\phi\phi$	FL grid & input switch scanning	<p>Pulse width: T_a = Approx. 1.0msec, T_b = Approx. 80μsec.</p>
3.	$P\phi 1$		
4.	$P\phi 2$		
5.	$P\phi 3$		
6.	ST0	_____	• Non connection.
7.	$P1\phi$	Reading of input switch state REW • STOP • TIME	<p>• Reads switch inputs corresponding to scanning of $P\phi\phi$ to $P\phi 3$.</p>

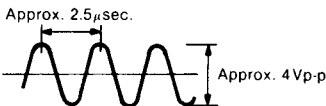
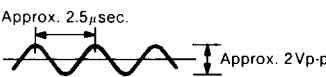
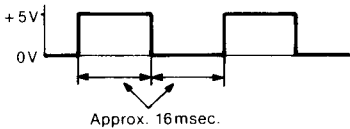
Terminal No.	Symbol	Name	Function/operation
8.	P11	Reading of input switch state FF • PAUSE • TAPE	<ul style="list-style-type: none"> • Reads switch inputs corresponding to scanning of Pφφ to Pφ3. <p>As each switch is pressed, the corresponding shaded section goes low.</p> <p>TAPE PAUSE FF</p>
9.	P12	Reading of input switch state REC • PLAY • TIMER • PLAY • COUNTER • RESET	<ul style="list-style-type: none"> • Reads switch inputs corresponding to scanning of Pφφ to Pφ3. <p>As each switch is pressed, the corresponding shaded section goes low.</p> <p>COUNTER TIMER PLAY REC RESET</p>
10.	P13	Reading of input switch state DIR • TIMER REC	<p>As each switch is pressed, the corresponding shaded section goes low.</p> <p>TIMER REC DIR</p>
11.	ST1		<p>Non connection.</p> <p>SYNC: Output waveforms during operation.</p> <p>Approx. 0.5μsec. Approx. 1.5μsec.</p>
12.	SYNC		
13.	SIRQ		
14.	IRQ		
15.	SBT		
16.	SBD		
17.	RST	Reset terminal	<ul style="list-style-type: none"> • Terminal for reset signal to computer. • Automatically reset at not more than 3.5 to 4.0V. <p>5.4V 4.0V L</p> <p>Power ON 0.6sec.</p>
18.	P2φ	Reading of input switch state AUTO REC MUTE • 1 • 5 • 9	<ul style="list-style-type: none"> • Reads switch inputs corresponding to scanning of Pφφ to Pφ3. <p>As each switch is pressed, the corresponding shaded section goes low.</p> <p>1 5 9 AUTO REC MUTE</p>

Terminal No.	Symbol	Name	Function/operation
19.	P21	Reading of input switch state DMS • 2 • 6 • 10	<ul style="list-style-type: none"> • Reads switch inputs corresponding to scanning of Pφφ to Pφ3. <p>As each switch is pressed, the corresponding shaded section goes low.</p> <p>2 6 10 D.M.S</p>
20.	P22	Reading of input switch state REPEAT • 3 • 7 • 11	<ul style="list-style-type: none"> • Reads switch inputs corresponding to scanning of Pφφ to Pφ3. <p>As each switch is pressed, the corresponding shaded section goes low.</p> <p>3 7 11 REPEAT</p>
21.	P23	Reading of input switch state B.S • 4 • 8 • 12	<ul style="list-style-type: none"> • Reads switch inputs corresponding to scanning of Pφφ to Pφ3. <p>As each switch is pressed, the corresponding shaded section goes low.</p> <p>4 8 12 B.S</p>
22.	P3φ	Dynamic lighting indication FWD • 1 • 5 • 9 LED	<ul style="list-style-type: none"> • Four corresponding LEDs light one at a time in accordance with the scanning of Pφφ to Pφ3. <p>As each switch is pressed, the corresponding shaded section goes low.</p> <p>1 5 9 FWD</p>
23.	P31	Dynamic lighting indication REV • 2 • 6 • 10 • LED	<ul style="list-style-type: none"> • Four corresponding LEDs light one at a time in accordance with the scanning of Pφφ to Pφ3. <p>As each switch is pressed, the corresponding shaded section goes low.</p> <p>2 6 10 REV</p>
24.	P32	Dynamic lighting indication REPEAT • 3 • 7 • 11 • LED	<ul style="list-style-type: none"> • Four corresponding LEDs light one at a time in accordance with the scanning of Pφφ to Pφ3. <p>As each switch is pressed, the corresponding shaded section goes low.</p> <p>3 7 11 REPEAT</p>

Terminal No.	Symbol	Name	Function/operation
25.	P33	Dynamic lighting indication B.S. • [4] • [8] • [12]	<ul style="list-style-type: none"> Four corresponding LEDs light one at a time in accordance with the scanning of P$\phi\phi$ to Pϕ3. 
26.	P4 ϕ	FL counter Segment g	  — Running indication — 
27.	P41	FL counter Segment f	
28.	P42	FL counter Segment e	
29.	P43	TIME	
30.	P5 ϕ	FL counter Segment d	
31.	P51	FL counter Segment c	
32.	P52	FL counter Segment b	Counter number changes when takeup reel table rotates two turns. Each segment of running indication changes when the reel table rotates a half turn. Waveforms change since dynamic lighting is used.
36.	P53	FL counter Segment a	<ul style="list-style-type: none"> “min”, “sec”, and “:” are displayed when the TIME signal is given. 
33.	VDD	Power supply terminal	<ul style="list-style-type: none"> Operative on 4.5 to 5.5 volts (typically 5.4 volts).
34.	VMM	Power supply terminal for the memory	<ul style="list-style-type: none"> Operative on 4.5 to 5.5 volts (typically 5.4 volts).
35.	HLD \overline{M}	Power hold instruction terminal for the memory	<ul style="list-style-type: none"> Operative on 4.5 to 5.5 volts (typically 5.4 volts).
37.	P6 ϕ	Reading of input switch state FWD REC INH	<ul style="list-style-type: none"> “High” level when a tape not prepared with miserase prevention masking is loaded. “Low” level with the cassette lid open.
38.	P61	Reading of input switch state REV REC INH	<ul style="list-style-type: none"> “High” level when a tape not prepared with miserase prevention masking is loaded. “Low” level with the cassette lid open.

Terminal No.	Symbol	Name	Function/operation
39.	P62	Reading of input switch state CAM A (S607)	
40.	P63	Reading of input switch state CAM B (S606)	<ul style="list-style-type: none"> Input in switching-over from FWD PLAY to REV PLAY. 
41.	P7 ϕ	Reading of input switch state Half det. (S603)	<ul style="list-style-type: none"> Goes “low” level when a cassette tape is loaded and the cassette lid is closed. “High” level with the cassette lid open.
42.	P71	Leader tape det	<ul style="list-style-type: none"> “Low” level pulses are generated between the leader tape section and the magnetic section. 
43.	P72	Detection of music intervals	<ul style="list-style-type: none"> Goes low during a portion between music pieces (no signal portion).
44.	P73		<ul style="list-style-type: none"> Non connection.
45.	P80	Muting for all amplifiers	<ul style="list-style-type: none"> “High” level during FF, REW and STOP. “Low” level during REC, PLAY and CUE/REV.
46.	P81	CUE/REVIEW MUTE	<ul style="list-style-type: none"> “High” level pulse with CUE/REVIEW button pressed during PLAY. 
47.	P82	Drive motor CCW rotation command	<ul style="list-style-type: none"> “High” level pulse in each mode in operational sequence REV PLAY → PAUSE → STOP → FOW PLAY. During switching between REV PLAY → FOW PLAY. 
48.	P83	Drive motor CW rotation command	<ul style="list-style-type: none"> “High” level pulse in each mode in operational sequence FOW PLAY → PAUSE → STOP → REV PLAY. During switching between FWD PLAY → REV PLAY. 
49.	P9 ϕ	REC indication output	<ul style="list-style-type: none"> “High” level concurrently with REC command. In TIMER REC mode, “High” level just after power on. 
50.	P91	PAUSE indication output	<ul style="list-style-type: none"> “High” level concurrently with PAUSE command. 

Terminal No.	Symbol	Name	Function/operation
51.	P92	Reel takeup torque selection and PLAY indication output	<ul style="list-style-type: none"> • "High" level during PLAY. • "Low" level during FF, REW and STOP.
52.	P93	DIRECTION indication output	<ul style="list-style-type: none"> • "Low" level during FORWARD. • "High" level during REVERSE.
53.	PA ϕ	Bias oscillation ON/OFF	<ul style="list-style-type: none"> • Goes to "Low" immediately after REC/PAUSE operation. • Remains in "Low" during REC/PLAY operation. • Goes to "Low" approximately 20msec after the STOP command is given. 
54.	PA1	REC MUTE	<ul style="list-style-type: none"> • "High" level pulse with REC MUTE button pressed during REC PLAY. 
55.	PA2	FF/REW motor rotation select (FF/REW motor CCW rotation command)	<ul style="list-style-type: none"> • "High" level during: <ul style="list-style-type: none"> FWD PLAY FWD F.F REV REW
56.	PA4	FF/REW motor rotation select (FF/REW motor CW rotation command)	<ul style="list-style-type: none"> • "High" level during: <ul style="list-style-type: none"> REV PLAY REV F.F FWD REW
57.	PB ϕ	Reel table rotation detection-1 (tape counter)	<ul style="list-style-type: none"> • Rotation pulses are generated according to the rotation speed of the take-up reel table in the FWD mode. • Two pulses are generated per reel table rotation. 
58.	PB1	Reel table rotation detection-2 (tape counter)	
59.	PB2	Output mute during power on	<ul style="list-style-type: none"> • Goes "high" level when power is on. • This terminal goes "low" level when terminal 17 goes "high" level. 
60.	PB3	Input switch reading Head rotation direction detection (S608)	<ul style="list-style-type: none"> • "High" level during FORWARD.

Terminal No.	Symbol	Name	Function/operation
61.	OSC2	Terminals for connecting the oscillator device of a clock	<ul style="list-style-type: none"> Generates oscillation at approximately 4MHz. 
62.	OSC1	Terminals for connecting the oscillator device of a clock	
63.	TC1	_____	<ul style="list-style-type: none"> Non connection.
64.	TC ϕ	_____	<ul style="list-style-type: none"> Non connection. 

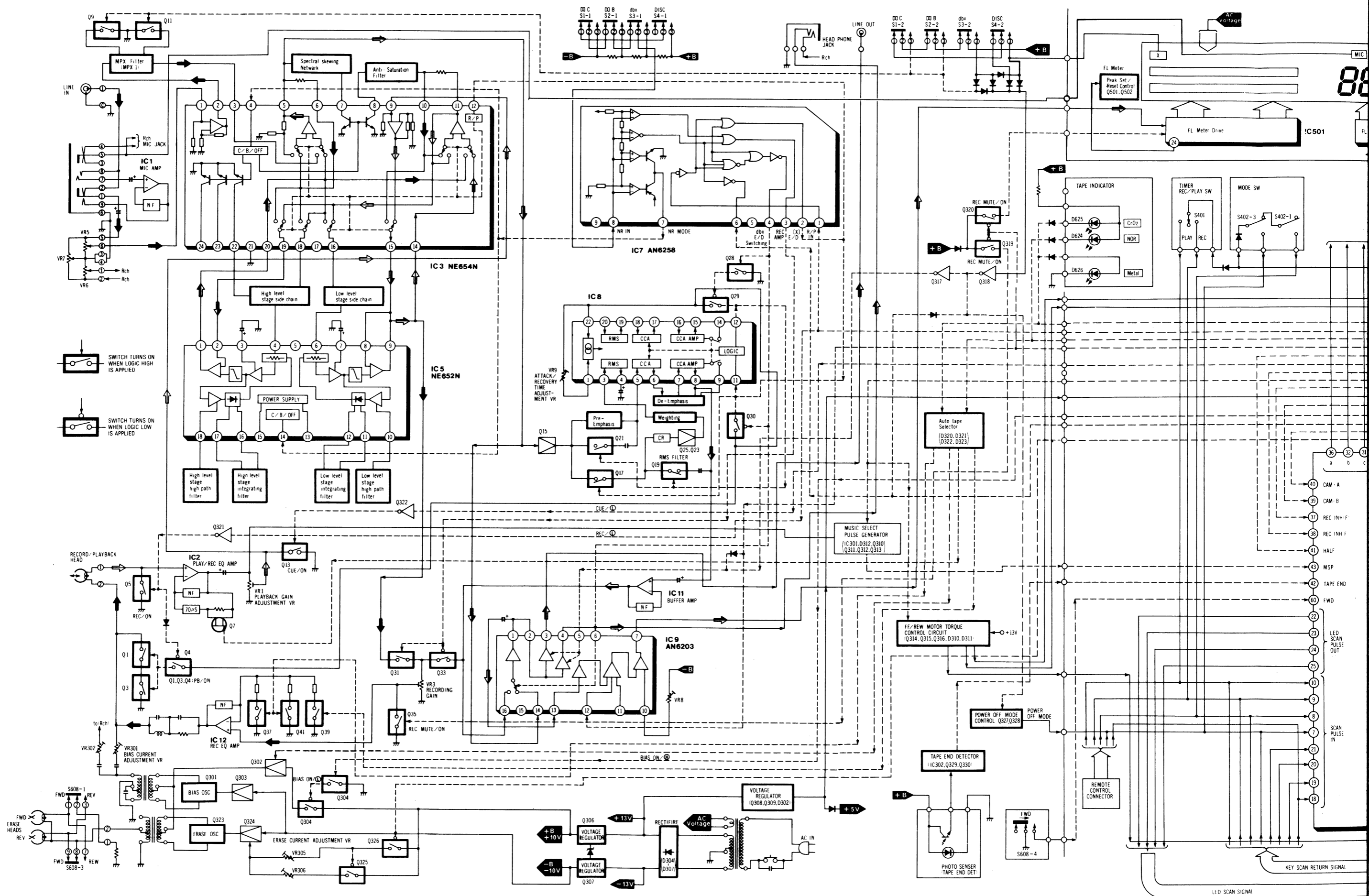
NOTES (for Block diagram)

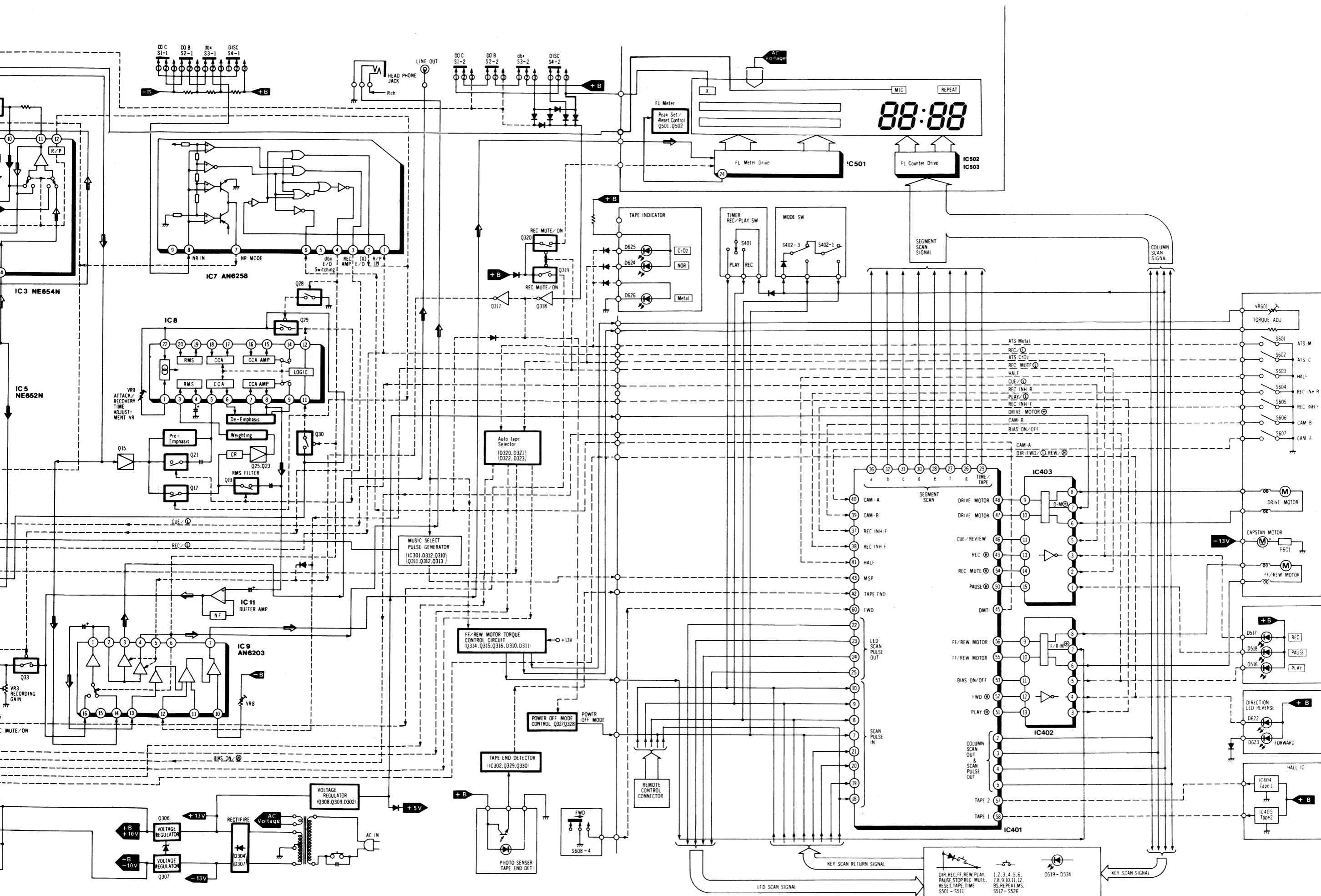
- S1-1, S1-2.....
Dolby-C IN/OUT switch (shown in OUT position).
- S2-1, S2-2.....
Dolby-B IN/OUT switch (shown in OUT position).
- S3-1, S3-2.....
dbx "Tape" IN/OUT switch (shown in OUT position).
- S4-1, S4-2.....
dbx "Disc" IN/OUT switch (shown in OUT position).
- S301.....
Power ON/OFF switch (shown in OFF position).
- S302.....
AC power voltage select switch.
- S401.....
Timer REC/PLAY switch (shown in Timer REC position).
- S402-1, S402-2.....
Mode select switch (⌚ / ⏮).
- S501.....
Direction switch (shown in OFF position).
- S502.....
Record switch (shown in OFF position).
- S503.....
F.F switch (shown in OFF position).
- S504.....
Rewind switch (shown in OFF position).
- S505.....
Play switch (shown in OFF position).
- S506.....
Pause switch (shown in OFF position).
- S507.....
Stop switch (shown in OFF position).
- S508.....
Auto-Rec mute switch (shown in OFF position).
- S509.....
Counter Reset switch (shown in OFF position).
- S510.....
Tape counter switch (shown in OFF position).
- S511.....
Time counter switch (shown in OFF position).
- S512.....
D.M.S. [1] switch (shown in OFF position).
- S513.....
D.M.S. [2] switch (shown in OFF position).
- S514.....
D.M.S. [3] switch (shown in OFF position).
- S515.....
D.M.S. [4] switch (shown in OFF position).
- S516.....
D.M.S. [5] switch (shown in OFF position).
- S517.....
D.M.S. [6] switch (shown in OFF position).
- S518.....
D.M.S. [7] switch (shown in OFF position).
- S519.....
D.M.S. [8] switch (shown in OFF position).
- S520.....
D.M.S. [9] switch (shown in OFF position).
- S521.....
D.M.S. [10] switch (shown in OFF position).
- S522.....
D.M.S. [12] switch (shown in OFF position).
- S523.....
D.M.S. [13] switch (shown in OFF position).
- S524.....
Blank Skip switch (shown in OFF position).
- S525.....
Repeat switch (shown in OFF position).
- S526.....
D.M.S. FWD/REV switch.
- S601.....
Auto tape select switch (for Metal tape).
- S602.....
Auto tape select switch (for CrO₂ tape).
- S603.....
Cassette half switch (shown in OFF position).
- S604.....
FWD Rec inhibit switch (shown in OFF position).
- S605.....
REV Rec inhibit switch (shown in OFF position).
- S606.....
FWD/REV changing switch (shown in OFF position).
- S607.....
Mode changing switch (shown in OFF position).
- S608.....
FWD/REV detection switch (shown in FWD position).

BLOCK DIAGRAM

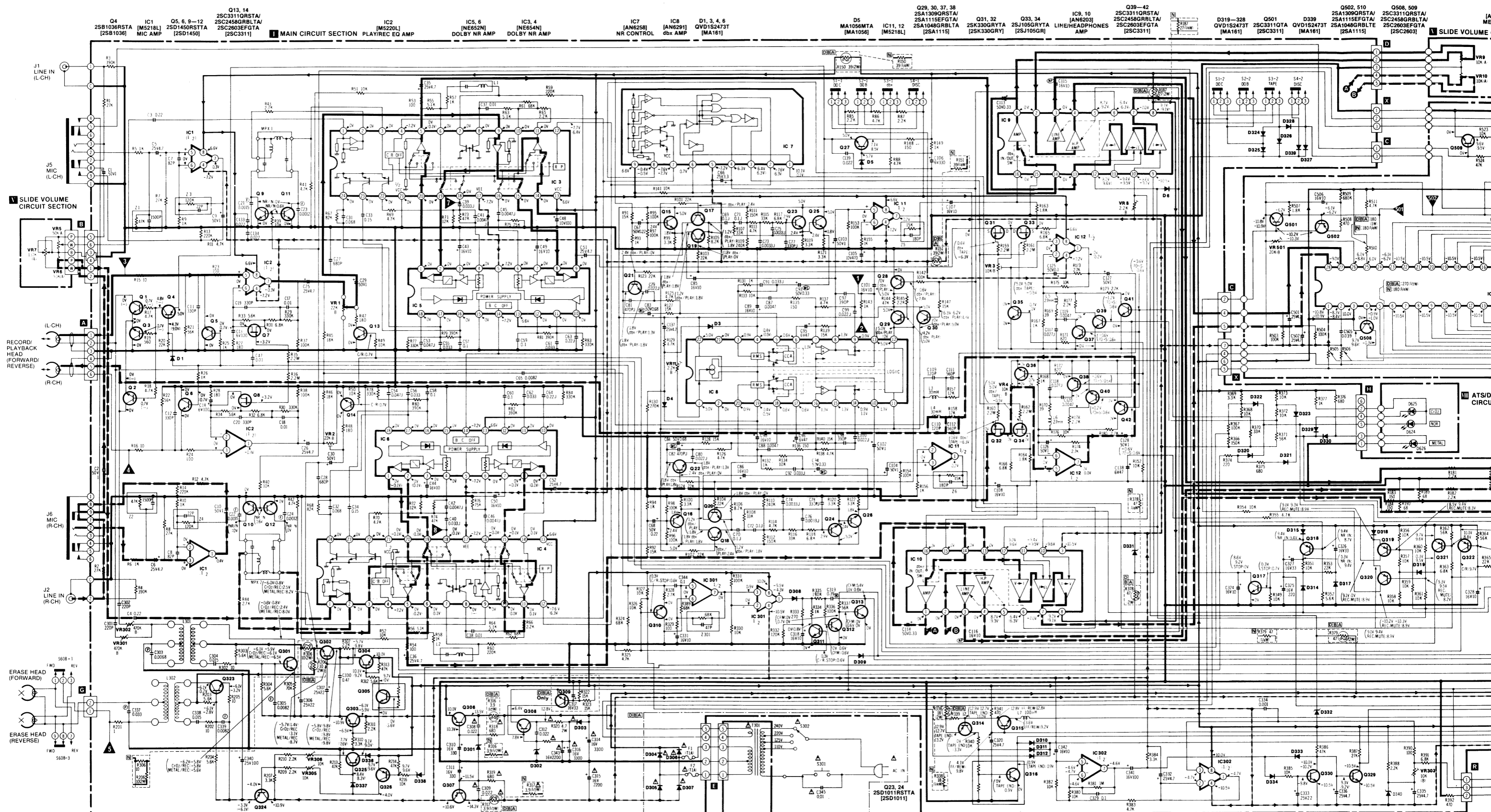
RS-B78R

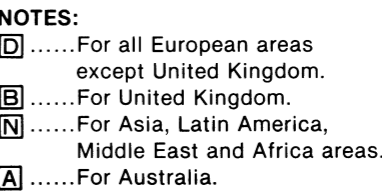
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SCHEMATIC DIAGRAM (for Main/FL Meter Section)





NOTES:

- S1-1, S1-2.....Dolby-C IN/OUT switch (shown in OUT position).
- S2-1, S2-2.....Dolby-B IN/OUT switch (shown in OUT position).
- S3-1, S3-2.....dbx "Tape" IN/OUT switch (shown in OUT position).
- S4-1, S4-2.....dbx "Disc" IN/OUT switch (shown in OUT position).
- S301.....Power ON/OFF switch (shown in OFF position).
- S302.....AC power voltage select switch.
- S401.....Timer REC/PLAY switch (shown in Timer REC position).
- S402-1, S402-3.....Mode select switch (○ / ▢).
- S501.....Direction switch (shown in OFF position).
- S502.....Record switch (shown in OFF position).
- S503.....F.F switch (shown in OFF position).
- S504.....Rewind switch (shown in OFF position).
- S505.....Play switch (shown in OFF position).
- S506.....Pause switch (shown in OFF position).
- S507.....Stop switch (shown in OFF position).
- S508.....Auto-Rec mute switch (shown in OFF position).
- S509.....Counter Reset switch (shown in OFF position).
- S510.....Tape counter switch (shown in OFF position).
- S511.....Time counter switch (shown in OFF position).
- S512.....D.M.S. 1 switch (shown in OFF position).
- S513.....D.M.S. 2 switch (shown in OFF position).
- S514.....D.M.S. 3 switch (shown in OFF position).
- S515.....D.M.S. 4 switch (shown in OFF position).
- S516.....D.M.S. 5 switch (shown in OFF position).
- S517.....D.M.S. 6 switch (shown in OFF position).
- S518.....D.M.S. 7 switch (shown in OFF position).
- S519.....D.M.S. 8 switch (shown in OFF position).
- S520.....D.M.S. 9 switch (shown in OFF position).
- S521.....D.M.S. 10 switch (shown in OFF position).
- S522.....D.M.S. 11 switch (shown in OFF position).
- S523.....D.M.S. 12 switch (shown in OFF position).
- S524.....Blank Skip switch (shown in OFF position).
- S525.....Repeat switch (shown in OFF position).
- S526.....D.M.S. FWD/REV switch.
- S601.....Auto tape select switch (for Metal tape).
- S602.....Auto tape select switch (for CrO₂ tape).
- S603.....Cassette half switch (shown in OFF position).
- S604.....FWD Rec inhibit switch (shown in OFF position).
- S605.....REV Rec inhibit switch (shown in OFF position).
- S606.....FWD/REV changing switch (shown in OFF position).
- S607.....Mode changing switch (shown in OFF position).
- S608.....FWD/REV detection switch (shown in FWD position).
- VR1, 2.....Playback gain adjustment VR.
- VR3, 4.....Overall gain adjustment VR.
- VR5, 6.....Input level controls.
- VR7.....Balance control.
- VR8.....FL meter adjustment VR (-40dB indication).
- VR9, 10.....Output level controls.
- VR11.....Attack recovery time adjustment VR.
- VR301, 302.....Bias current adjustment VR.
- VR303.....Photo sensor sensitivity adjustment VR.
- VR305, 306.....Erase current adjustment VR.
- VR501.....FL meter adjustment VR (0dB indication).
- VR601.....Takeup torque adjustment VR.
- L1, L2.....Skewing Network.
- L3, L4.....Bias Trap Coil.
- L5, L6.....Peaking Coil.
- L7.....Check Coil.
- L301, L302.....Bias Oscillation Coil.
- L401.....Choke Coil.
- L601—L604.....Choke Coil.
- MPX1, 2.....Multiplex Filter.
- Resistance are in ohms (Ω), 1/4 watt unless specified otherwise.
1K = 1,000(Ω), 1M = 1,000k(Ω)
- Capacity are in micro-farads (μF) unless specified otherwise.
- The mark (▼) shows test point. e.g. ▼ = Test point 1.
- All voltage values shown in circuitry are under no signal condition and playback mode with volume control at minimum position otherwise specified.
- ().....Voltage values at record mode.
- dbx/PLAY.....Voltage values at dbx encode mode.
- dbx/TAPE.....Voltage values at dbx encode or decode mode.
- CrO₂.....Voltage values at CrO₂ tape mode.
- Metal.....Voltage values at Metal tape mode.
- Stop.....Voltage values at Stop mode.
- C/R.....Voltage values at CUE/REV mode.
- FF/REW.....Voltage values at FF/REW mode.
- REC MUTE.....Voltage values at AUTO REC MUTE mode.
- 70μs.....Voltage values at CrO₂ or Metal tape mode.
- NR IN.....Voltage value at which the noise reduction switch is turned on.
- CFM.....Voltage value at which the test tape QZZCFM (315Hz/0dB) is played.
- TAPE END.....Voltage at the end of the cassette tape.
- For measurement use VTVM.
- (●) indicates B+ (bias).
- (■) indicates B- (bias).
- (→) indicates the flow of the playback signal. (NR out).
- (←) indicates the flow of the recording signal. (NR out).

- Important safety notice
Components identified by Δ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
- Described in the schematic diagram are two types of numbers; the supply parts numbers and production parts number for transistors and diodes. One type of number is used for supply parts number and production parts number when they are identical.

e.g. Q1
2SC1844(E,F) — Production parts number
[2SC1844E] — Supply parts number
D212
1S2473T77 — Production parts number
[MA161] — Supply parts numbers

- The supply parts number is described alone in the replacement parts list.

- This schematic diagram may be modified at any time with the development of new technology.

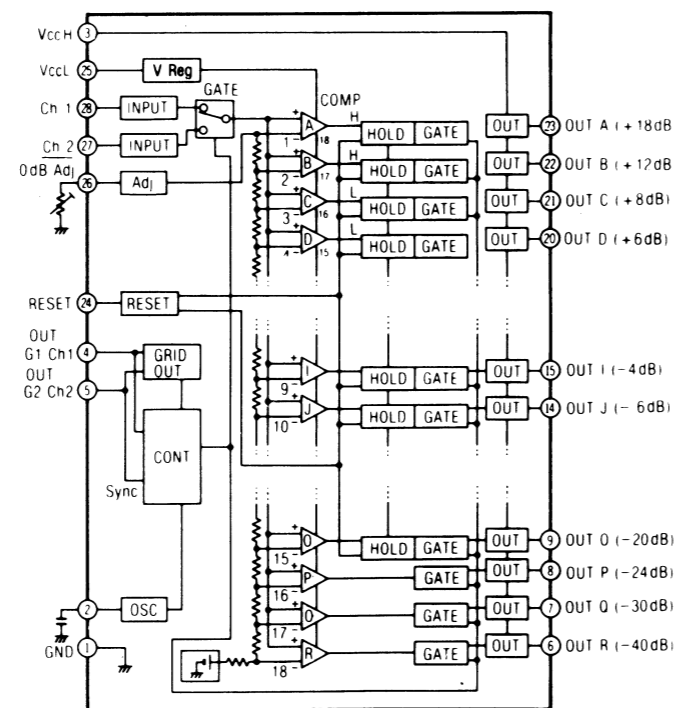
- * Output level control...MAX
- * Input level control ...MAX
- * Balance controlCenter

SPECIFICATIONS

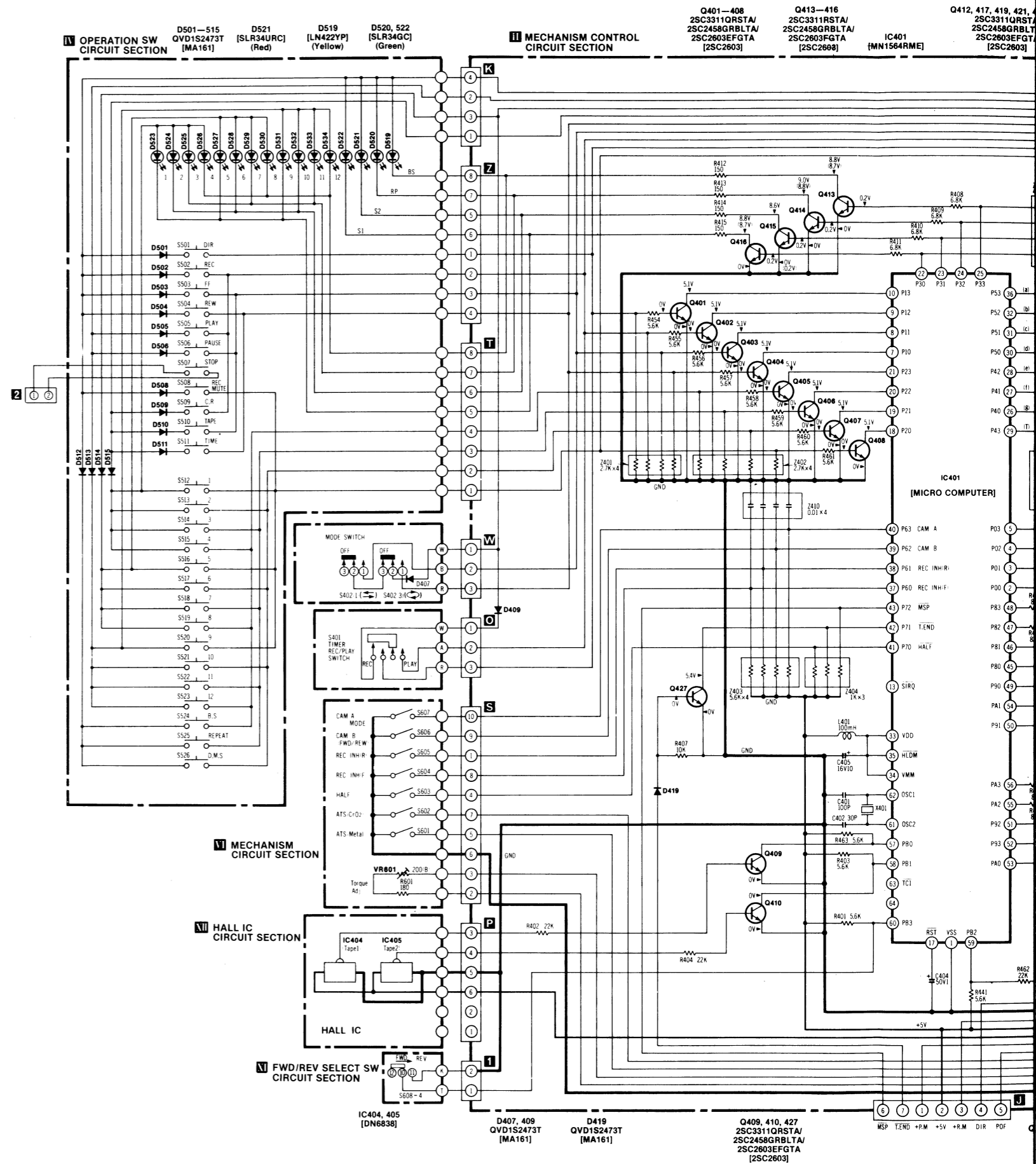
Playback S/N ratio * Test tape...QZZCFM	Greater than 45dB
Overall distortion * Test tape ...QZZCRA for Normal ...QZZCRX for CrO ₂ ...QZZCRZ for Metal	Less than 4%
Overall S/N ratio * Test tape...QZZCRA	Greater than 43dB (without NAB filter)

EQUIVALENT CIRCUIT

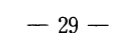
IC501: AN6870N



SCHEMATIC DIAGRAM (for Mechanism/Mechanism Control Section)



ATE OUT 6 OUT R (-40dB)



ELECTRICAL PARTS LIST

NOTES:

RESISTORS

ERD.....Carbon
ERG.....Metal-oxide
ERS.....Metal-oxide
ERO.....Metal-film
ERX.....Metal-film
ERC.....Fuse type metallic
ERQ.....Solid
ERF.....Cement

CAPACITORS

ECBA.....Ceramic
ECG.....Ceramic
ECK.....Ceramic
ECC.....Ceramic
ECF.....Ceramic
ECQM.....Polyester film
ECQE.....Polyester film
ECQF.....Polypropylene
ECE.....Electrolytic
ECEN.....Non polar electrolytic
ECQS.....Polystyrene
ECS.....Tantalum
QCS.....Tantalum

REPLACEMENT PARTS LIST

Important safety notice
Components identified by Δ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

Ref. No.	Part No.	Part Name & Description
CONNECTORS		
CN 1	QJT1090	Check Pin
CN 2	QJT1054	Contact
CN 3	QJS1920TN	2 Pin Socket
CN 4	QJP1920TN	2 Pin Plug
CN 5	QJS1921TN	3 Pin Socket
CN 6	QJP1921TN	3 Pin Plug
CN 7	QJS1922TN	6 Pin Socket
CN 8	QJP1922TN	6 Pin Plug
CN 9	QJS1987S	Jumper Socket (4 Pin)
CN 10	QJS1961S	Jumper Socket (5 Pin)
CN 11	QJS1993S	Jumper Socket (6 Pin)
CN 12	QJS1962S	Jumper Socket (7 Pin)
CN 13	QJS1983S	Jumper Socket (8 Pin)
CN 14	QJS1994S	Jumper Socket (6 Pin/Type-L)
CN 15	QJS2004S	Jumper Socket (10 Pin/Type-L)

Ref. No.	Part No.	Ref. No.	Part No.
RESISTORS			
R 1, 2	ERD25TJ273	R 45, 46	ERD25TJ183
R 3, 4	ERD25TJ394	R 47, 48	ERD25FJ181
R 5, 6	ERD25FJ102	R 49, 50, 51, 52	ERD25FJ103
R 7, 8	ERD25TJ273	R 53, 54	ERD25FJ101
R 9, 10	ERD25FJ102	R 55, 56	ERD25FJ512
R 11, 12	ERD25FJ472	R 57, 58	ERD25FJ102
R 13, 14	ERD25TJ224	R 59, 60	ERD25TJ224
R 15, 16	ERD25FJ100	R 61, 62	ERD25TJ683
R 17, 18	ERD25FJ472	R 63, 64	ERD25FJ512
R 19	ERD25FJ561	R 65, 66	ERD25FJ222
R 20	ERD25TJ223	R 67, 68	ERD25TJ823
R 21, 22	ERD25TJ563	R 69, 70	ERD25FJ472
R 23, 24	ERD25FJ101	R 71, 72	ERD25TJ123
R 25, 26	ERD25FJ102	R 73, 74	ERD25TJ473
R 27, 28	ERD25FJ181	R 75, 76	ERD25TJ753
R 29, 30	ERD25TJ334	R 77, 78	ERD25TJ334
R 31, 32	ERD25FJ682	R 79, 80, 81, 82	ERD25TJ394
R 33, 34	ERD25FJ562	R 83, 84	ERD25TJ334
R 35, 36	ERD25TJ225	R 85	ERD25FJ222
R 37, 38	ERD25TJ104	R 86	ERD25FJ472
R 39, 40	ERD25FJ103	R 87	ERD25FJ222
R 41, 42	ERD25FJ472	R 88	ERD25FJ472
R 43, 44	ERD25FJ272	R 91, 92	ERD25TJ153

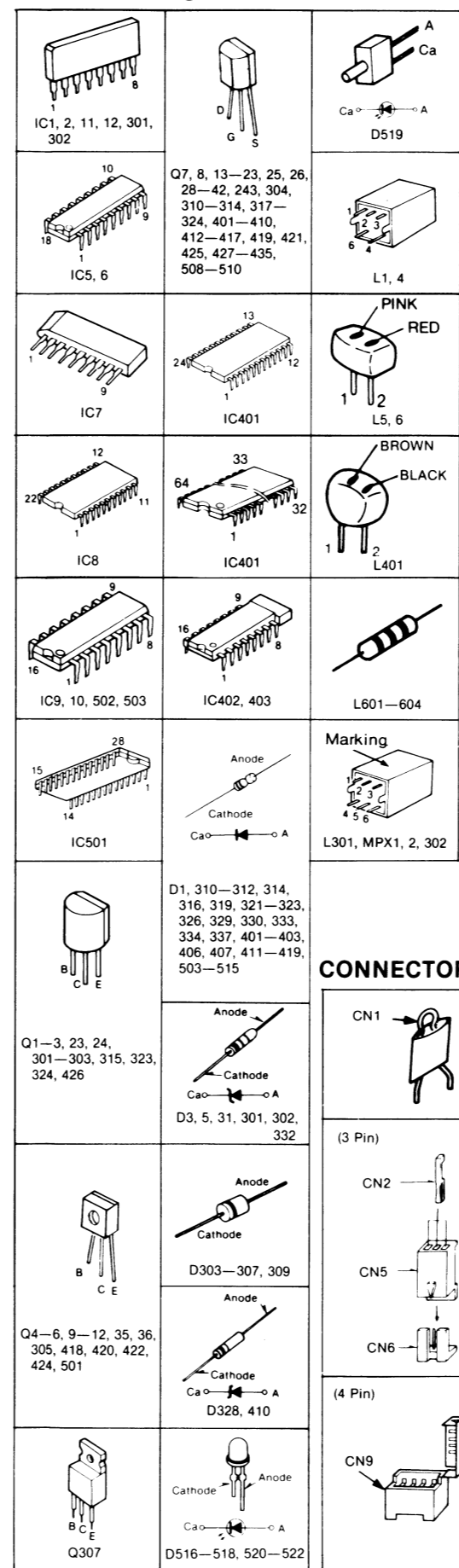
Ref. No.	Part No.	Ref. No.	Part No.
R 93, 94	ERD25FJ102	R 311	ERD25FJ222
R 95, 96, 97, 98	ERD25TJ104	R 312	ERD25FJ562
R 99, 100	ERD25FJ332	R 313	ERD25TJ473
R 101, 102, 103, 104	ERD25TJ223	R 316, 317	[N] Δ ERX12ANJ3R9
			[For Asia, Latin America, Middle East and Africa areas.]
R 105, 106	ERD25FJ822	R 318, 319	[D][B][A] Δ ERQ12HJ3R9
R 107, 108	ERD25TJ333		[For all European and Australia.]
R 109, 110	ERD25TJ244	R 320	Δ ERX2ANJ4R7
R 111, 112	ERD25TJ154	R 321	Δ ERD25FJ102
R 113, 114	ERD25FJ472	R 322, 323	[D][B][A] ERD25TJ153
R 115, 116	ERD25TJ333		[For all European and Australia.]
R 117, 118	ERD25FJ682	R 324	ERD25TJ683
R 119, 120, 121, 122	ERD25FJ332	R 325	ERD25FJ472
R 123, 124	ERD25TJ223	R 326, 327	ERD25FJ103
R 125, 126	ERD25FJ472	R 328	ERD25FJ272
R 127, 128	ERD25TJ153	R 329	ERD25FJ101
R 129	ERD25FJ472	R 330	ERD25FJ103
R 130	ERD25TJ274	R 331	ERD25TJ104
R 131, 132	ERD25FJ102	R 332	ERD25TJ124
R 133, 134	ERD25FJ103	R 333	ERD25FJ221
R 135, 136	ERD25FJ151	R 334	ERD25FJ102
R 137, 138	ERD25FJ472	R 335	ERD25TJ184
R 139, 140	ERD25TJ153	R 336	ERD25TJ104
R 141	ERD25FJ103	R 337	ERD25TJ563
R 142	ERD25TJ104	R 338 [N]	ERD25FJ180
R 143	ERD25FJ102		[For Asia, Latin America, Middle East and Africa areas.]
R 144	ERD25TJ473	R 339	ERD25FJ120
R 145	ERD25FJ222	R 340	ERD25FJ103
R 147	ERD25TJ153	R 341	ERD25FJ471
R 148	ERD25FJ151	R 345	ERD25FJ103
R 149	ERD25FJ102	R 349	ERD25FJ103
R 150, 151	ERD25FJ390	R 351	ERD25FJ103
	[N]	R 352	ERD25FJ562
	[For Asia, Latin America, Middle East and Africa areas.]	R 353	ERD25TJ473
	[D][B][A] ERD2FCG180	R 354	ERD25FJ103
	[For all European and Australia.]	R 355	ERD25FJ472
R 152	ERD25FJ103	R 356, 357, 358, 359, 360, 361	ERD25FJ103
R 153, 154	ERD25TJ104	R 362	ERD25FJ103
R 155, 156	ERD25FJ102	R 363	ERD25FJ682
R 157, 158	ERD25TJ123	R 364	ERD25TJ563
R 159, 160, 161, 162	ERD25TJ225	R 365	ERD25TJ223
R 163, 164	ERD25FJ182	R 366	ERD25TJ154
R 165, 166	ERD25FJ682	R 367	ERD25TJ104
R 167, 168	ERD25FJ102	R 368	ERD25FJ103
R 169, 170	ERD25FJ390	R 369	ERD25FJ332
R 171, 172	ERD25FJ821	R 370	ERD25TJ333
R 173, 174	ERD25FJ272	R 371	ERD25TJ563
R 175, 176	ERD25FJ103	R 372, 373	ERD25FJ103
R 177, 178	ERD25FJ222	R 374	ERD25FJ221
R 179, 180	ERD25FJ272	R 375, 376	ERD25FJ681
R 181, 182	ERD25FJ821	R 377	ERD25FJ102
R 183, 184	ERD25FJ101	R 378, 379	ERD25FJ470
R 185, 186	ERD25TJ473		[N]
R 187 [N]	ERD25FJ270		[For Asia, Latin America, Middle East and Africa areas.]
	[For Asia, Latin America, Middle East and Africa areas.]	R 380	ERD25FJ103
	[D][B][A] ERD2FCG270	R 381	ERD25TJ105
	[For all European and Australia.]	R 382	ERD25FJ103
R 189, 190	ERD25FJ680	R 383	ERD25FJ472
R 201	ERD25FJ1R0	R 384	ERD25FJ332
R 202	ERD25FJ100	R 385	ERD25FJ103
R 203, 204	ERD25FJ562	R 386	ERD25TJ473
R 205	ERD25FJ100	R 387	ERD25TJ273
R 206 [N]	ERD25FJ100	R 388	ERD25FJ222
	[For Asia, Latin America, Middle East and Africa areas.]	R 389	ERD25TJ683
	[D][B][A] ERD2FCG100	R 390	ERD25FJ101
	[For all European and Australia.]	R 391	ERD25FJ682
R 207	ERD25FJ332	R 392	ERD25FJ471
R 209, 210	ERD25FJ222	R 393	ERD25FJ102
R 213, 214	ERD25TJ473	R 394	ERD25FJ682
R 216	ERD25FJ103	R 395	ERD25TJ183
R 302	ERD25FJ100	R 396, 397	ERD25FJ103
R 303, 304	ERD25FJ562	R 398, 399	ERD25FJ472
R 305	ERD25FJ100	R 402	ERD25TJ223
R 306 [N]	ERD25FJ100	R 403	ERD25FJ562
	[For Asia, Latin America, Middle East and Africa areas.]	R 404	ERD25TJ223
	[D][B][A] ERD2FCG100		
	[For all European and Australia.]		
R 307	ERD25FJ222		
R 310	ERD25FJ332		

Ref. No.	Part No.	Ref. No.	Part No.
R 407	ERD25TJ103	R 407	ERD25TJ103
R 408, 409, 410, 411	ERD25FJ682	R 408, 409, 410, 411	ERD25FJ682
R 412, 413, 414, 415	ERD25FJ151	R 412, 413, 414, 415	ERD25FJ151
R 416	ERD25FJ562	R 416	ERD25FJ562
R 420	ERD25FJ562	R 420	ERD25FJ562
R 424	ERD25FJ562	R 424	ERD25FJ562
R 428	ERD25FJ562	R 428	ERD25FJ562
R 432	ERD25FJ471	R 432	ERD25FJ471
R 437, 438, 439	ERD25FJ681	R 437, 438, 439	ERD25FJ681
R 440	ERD25FJ471	R 440	ERD25FJ471
R 441	ERD25FJ562	R 441	ERD25FJ562
R 442, 443, 444, 445, 446, 447, 448, 449	ERD25TJ103	R 442, 443, 444, 445, 446, 447, 448, 449	ERD25TJ103
R 450, 451, 452, 453	ERD25FJ821	R 450, 451, 452, 453	ERD25FJ821
R 454, 455, 456, 457, 458, 459, 460, 461	ERD25FJ562	R 454, 455, 456, 457, 458, 459, 460, 461	ERD25FJ562
R 462	ERD25TJ223	R 462	ERD25TJ223
R 463	ERD25FJ562	R 463	ERD25FJ562
R 464	ERD25FJ103	R 464	ERD25FJ103
R 503, 504	ERD25TJ104	R 503, 504	ERD25TJ104
R 505, 506	ERD25TJ181	R 505, 506	ERD25TJ181
	[N]		[N]
	[For Asia, Latin America, Middle East and Africa areas.]		[For Asia, Latin America, Middle East and Africa areas.]
	[D][B][A] ERG12ANJ271		[D][B][A] ERG12ANJ271
	[For all European and Australia.]		[For all European and Australia.]
R 507	ERD25FJ182	R 507	ERD25FJ182
R 508	ERD25FJ471	R 508	ERD25FJ471
R 509	ERD25TJ684	R 509	ERD25TJ684
R 510 [N]	ERD25TJ181	R 510 [N]	ERD25TJ181
	[For Asia, Latin America, Middle East and Africa areas.]		[For Asia, Latin America, Middle East and Africa areas.]
	[D][B][A] ERG1ANJ181		[D][B][A] ERG1ANJ181
	[For all European and Australia.]		[For all European and Australia.]
R 511	ERD25FJ472	R 511	ERD25FJ472
R 512, 513, 523	ERD25FJ103	R 512, 513, 523	ERD25FJ103
R 524, 525	ERD25TJ473	R 524, 525	ERD25TJ473
R 526	ERD25FJ103	R 526	ERD25FJ103
R 601	ERD25TJ181	R 601	ERD25TJ181
VARIABLE RESISTORS			
VR 1, 2	QVNB3A00B223	VR 1, 2	QVNB3A00B223
VR 3, 4	QVNB3A00B103	VR 3, 4	QVNB3A00B103
VR 5, 6	QVBP1PUA5A	VR 5, 6	QVBP1PUA5A
VR 7	QVAL5KUG15	VR 7	QVAL5KUG15
VR 8	QVNB3A00B222	VR 8	QVNB3A00B222
VR 9, 10	QVBF1PUA14	VR 9, 10	QVBF1PUA14
VR 11	QVNB3A00B222	VR 11	QVNB3A00B222
VR 301, 302	QVNB3A00B474	VR 301, 302	QVNB3A00B474
VR 303, 305, 306	QVNB3A00B103	VR 303, 305, 306	QVNB3A00B103
VR 501	QVNB3A00B223	VR 501	QVNB3A00B223
VR 601	EVNK4AA00B22	VR 601	EVNK4AA00B22
CAPACITORS			
C 1, 2	ECEA50Z1	C 1, 2	ECEA50Z1
C 3, 4	ECQM1H224JZ	C 3, 4	ECQM1H224JZ
C 5, 6	ECEA1ES4R7	C 5, 6	ECEA1ES4R7
C 7, 8	ECCD1H820K	C 7, 8	ECCD1H820K
C 9, 10	ECEA50Z1	C 9, 10	ECEA50Z1
C 11, 12	ECCD1H331KB	C 11, 12	ECCD1H331KB
C 13, 14	ECEA0JS101	C 13, 14	ECEA0JS101
C 17, 18	ECQM1H103JZ	C 17, 18	ECQM1H103JZ
C 19, 20	ECCD1H331KB	C 19, 20	ECCD1H331KB
C 21, 22	ECFDD152KVY	C 21, 22	ECFDD152KVY
C 23, 24	ECFDD122KVY	C 23, 24	ECFDD122KVY
C 25, 26	ECEA1ES4R7	C 25, 26	ECEA1ES4R7
C 27, 28	ECCD1H681KB	C 27, 28	ECCD1H681KB
C 29, 30	ECEA50Z1	C 29, 30	ECEA50Z1
C 31, 32	ECQM1H683JZ	C 31, 32	ECQM1H683JZ
C 33, 34	ECQM1H154JZ	C 33, 34	ECQM1H154JZ
C 35, 36	ECEA1ES4R7	C 35, 36	ECEA1ES4R7
C 37, 38	ECQM1H103JZ	C 37, 38	ECQM1H103JZ
C 39, 40	ECQM1H333JZ	C 39, 40	ECQM1H333JZ
C 41, 42	ECQM1H472JZ	C 41, 42	ECQM1H472JZ
C 43, 44	ECEA1CS100	C 43, 44	ECEA1CS100
C 45, 46	ECQM1H472JZ	C 45, 46	ECQM1H472JZ
C 47	ECFDD103KXY	C 47	ECFDD103KXY
C 48	ECEA1AS101	C 48	ECEA1AS101
C 49, 50	ECEA1CS100	C 49, 50	ECEA1CS100
C 51, 52	ECEA1ES4R7	C 51, 52	ECEA1ES4R7
C 53, 54	ECQM1H473JZ	C 53, 54	ECQM1H473JZ
C 55, 56	ECQM1H333JZ	C 55, 56	ECQM1H333JZ
C 57, 58, 59, 60	ECQM1H104JZ	C 57, 58, 59, 60	ECQM1H104JZ
COMBINATION PARTS			
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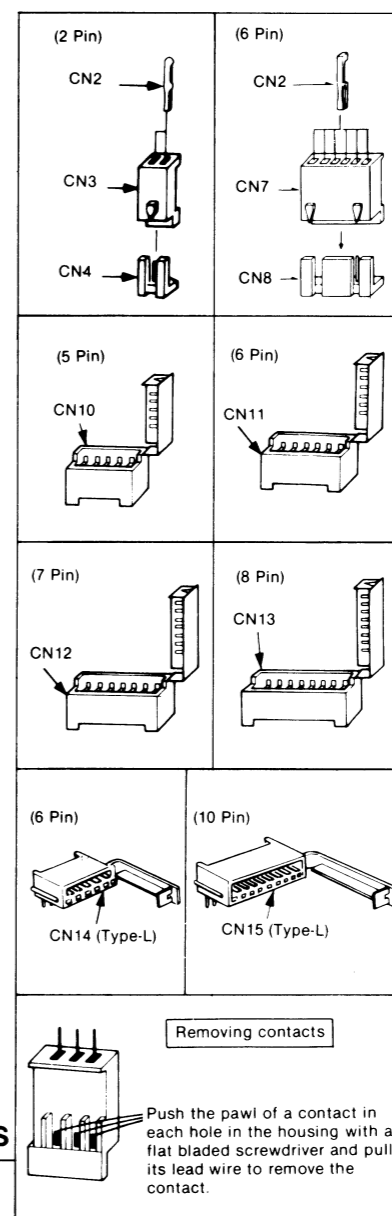
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Z 301	EXRP470K683	D 335	LD702DU	
Z 401, 402	EXBEQ4272K	D 336, 337	MA161	
Z 403	EXBEQ4562K	D 338	MA1056	
Z 404	EXBEQ4102K	D 339	MA161	
Z 405	EXBEQ4272K	D 340	MA1062	
Z 406, 407	EXBEQ4563K	D 401, 402, 403, 404, 405, 407	MA161	
Z 408	EXBEQ4272K	D 409	MA161	
Z 409	EXBEQ4472K	D 410	MA1120	
Z 410	EXFP4103ZW			
TRANSISTORS		D 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422	MA161	
Q 1, 2, 3	2SD1011	D 501, 502, 503, 504, 505, 507, 508, 509, 510, 511, 512, 513, 514, 515	MA161	
Q 4	2SB1036	D 516	SLR34GC	
Q 5, 6	2SD1450	D 517	SLR34URC	
Q 7, 8	2SK330GRY	D 518	SLR34YC	
Q 9, 10, 11, 12	2SD1450	D 519	LN422YP	
Q 13, 14, 15, 16, 17, 18, 19, 20, 21, 22	2SC3311	D 520	SLR34GC	
Q 23, 24	2SD1011	D 521	SLR34URC	
Q 25, 26, 27, 28	2SC3311	D 522	SLR34GC	
Q 29, 30	2SA1115	D 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000		
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Part No.	Ref. No.	Part No.	Ref. No.	Part No.	Ref. No.	Part No.	Ref. No.	Part No.
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ERD25FJ682 414, 415	C 63, 64	ECQM1H224JZ	Z 5, 6	EXRP181K153	D 333, 334	MA161	QVDSL0050	
ERD25FJ151	C 65	ECQM1H822JZ	Z 301	EXRP470K6B3	D 335	LD702DU	(With ATS/Direction Circuit Board)	
ERD25FJ562	C 66	ECEA1EN3R3	Z 401, 402	EXBEQ4272K	D 336, 337	MA161		
ERD25FJ562	C 67, 68	ECEA5OZR22	Z 403	EXBEQ4562K	D 338	MA1056		
ERD25FJ562	C 69, 70, 71, 72	ECQM1H104JZ	Z 404	EXBEQ4102K	D 339	MA161		
ERD25FJ562	C 73, 74, 75, 76	ECQM1H332JZ	Z 405	EXBEQ4272K	D 340	MA1062		
ERD25FJ471 439	C 77, 78	ECCD1H331K	Z 406, 407	EXBEQ4563K	D 401, 402, 403, 404, 405, 406,		IC 1	M5218L
ERD25FJ681	C 79, 80	ECQM1H223JZ	Z 408	EXBEQ4272K	D 407	MA161	IC 2	M5220L
ERD25FJ471	C 81, 82	ECCD1H471K	Z 409	EXBEQ4472K	D 409	MA161	IC 3, 4	N6E54N
ERD25FJ562	C 83, 84	ECEA5OMR68R	Z 410	EXPFP4103ZW	D 410	MA1120	IC 5, 6	N6E52N
444, 445, 446, 447, ERD25TJ103	C 85, 86	ECEA1CS100	TRANSISTORS		D 411, 412, 413, 414, 415, 416,		IC 7	AN6258
452, 453	C 87, 88	ECQM1H472JZ	Q 1, 2, 3	2SD1011	417, 418, 419, 420, 421	MA161	IC 8	AN6291
ERD25FJ821	C 89, 90	ECEA16Z10	Q 4	2SB1036	D 501, 502, 503, 504, 505, 506,		IC 9, 10	AN6203
456, 457, 458, 459, ERD25FJ562	C 91, 92	ECQM1H333JZ	Q 5, 6	2SD1450	507, 508, 509, 510, 511, 512,		IC 11, 12	M5218L
ERD25TJ223	C 93, 94	ECEA50MR33R	Q 7, 8	2SK330GRY	513, 514, 515		IC 301, 302	M5218L
ERD25FJ562	C 95, 96	ECEAOJS470	Q 9, 10, 11, 12	2SD1450	D 516	MA161	IC 401	MN1564RME
ERD25FJ562	C 97, 98	ECCD1H391J	Q 13, 14, 15, 16, 17, 18, 19, 20,	2SD1450	D 517	SLR34GC	IC 402	AN6271
ERD25FJ103	C 99, 100	ECQM1H223JZ	21, 22	2SC3311	D 518	SLR34URC	IC 404, 405	DN6838
ERD25TJ104	C 101	ECEA1CS100	Q 23, 24	2SD1011	D 519	LN422YP	IC 501	AN6870N
	C 102, 103, 104	ECEA50Z1	Q 25, 26, 27, 28	2SC3311	D 520	SLR34GC	IC 502, 503	AN6280
ERD25TJ181 a, Latin America, East and Africa	C 105	ECEA1AS471	Q 29, 30	2SA1115	D 521	SLR34URC	IC PROTECTOR	
	C 106	ECEAOJS331	Q 31, 32	2SK330GRY	D 522	SLR34GC	F 601	QRUF10WH
ERG12ANJZ71 European and	C 107, 108	ECEA1CS100	Q 33, 34	2SJ105GR	D 523, 524, 525, 526, 527, 528,		CERAMIC RESONATOR	
	C 109, 110	ECKD2H121KB	Q 35, 36	2SD1450	529, 530, 531, 532, 533, 534		X 401	EF0A4R0M01A
					refer to	S512—S523		
					(D.M.S. [1]—[12] Indication LED)			

TERMINATIONS

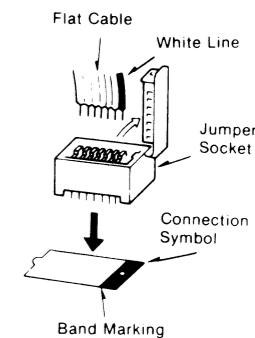


CONNECTORS




CONNECTION OF A FLAT CABLE

Connect the flat cable to the jumper socket so that the white line on the flat cable corresponds to the band mark side of the connection symbol (yellow or white symbol on the PC board) for the jumper socket. (This connection may differ from those for conventional models.)



NOTES (for Circuit boards)

- The circuit shown in  on the conductor side indicates printed circuit on the back side of the printed circuit board.
- All voltage values shown in circuitry are under no signal condition and playback mode with volume control at minimum position.
For measurement, use VTMV.

- This circuit board diagram may be modified at any time with the development of new technology.

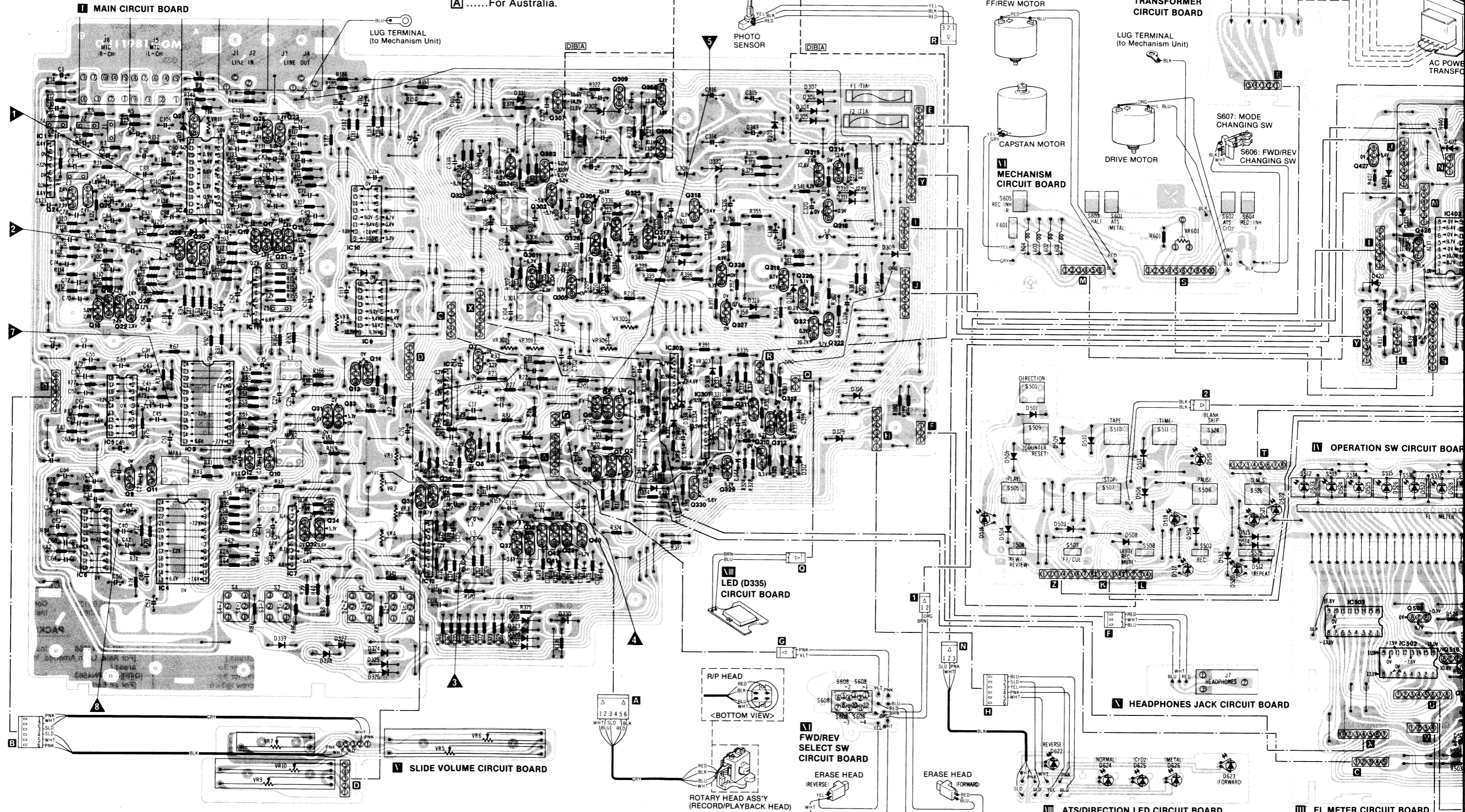
NOTES:

- | | |
|------------------------|----------------------|
| BLKBlack | ORGOrange |
| BLUBlue | PNKPink |
| BRNBrown | REDRed |
| GRYGray | SLDShield Wire |
| GRNGreen | VLTViolet |
| L. BLULight Blue | WHTWhite |
| NILNo Color Mark | YELYellow |

CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM

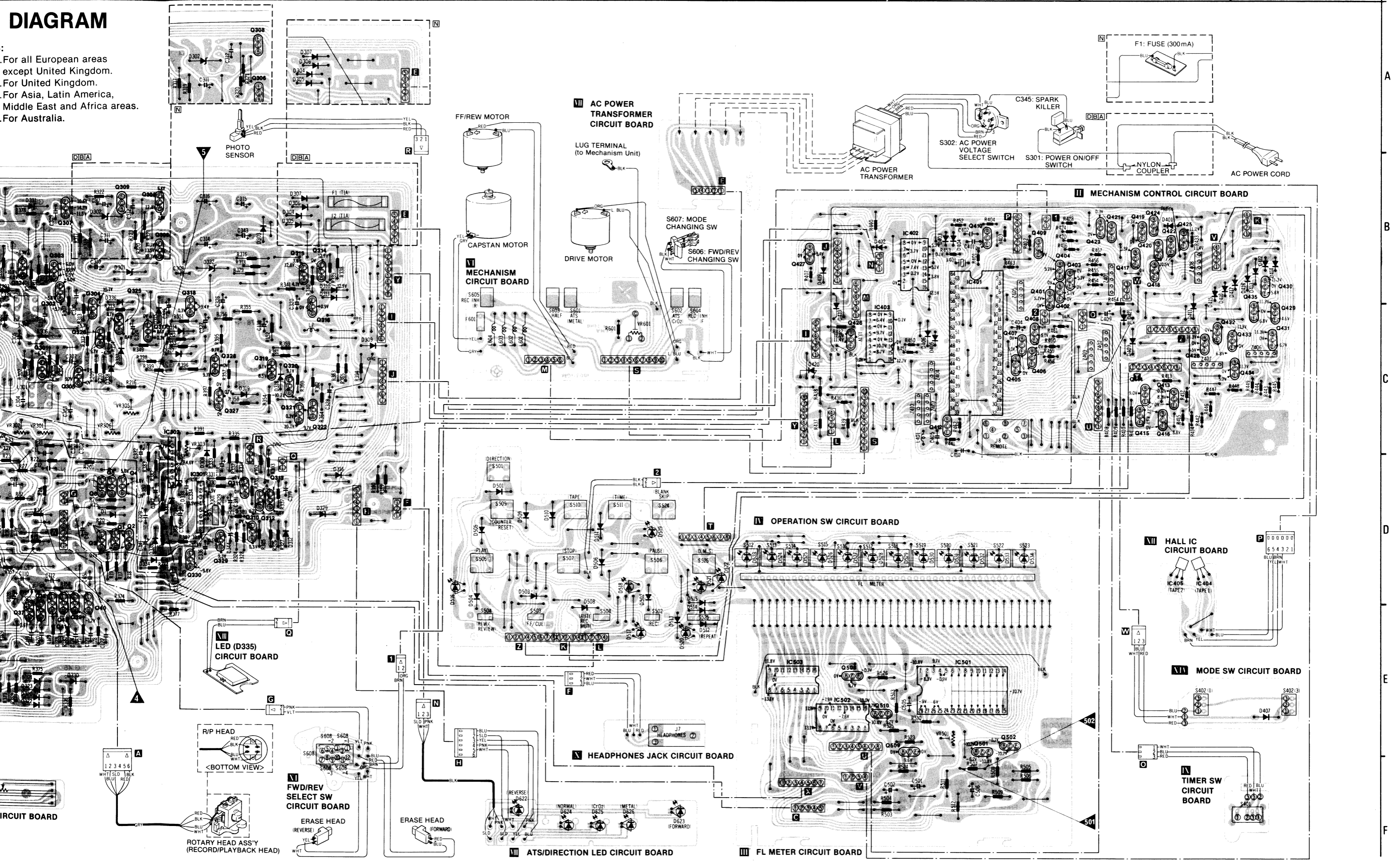
NOTES:

- D** For all European areas except United Kingdom.
- B** For United Kingdom.
- N** For Asia, Latin America, Middle East and Africa areas.
- A** For Australia.

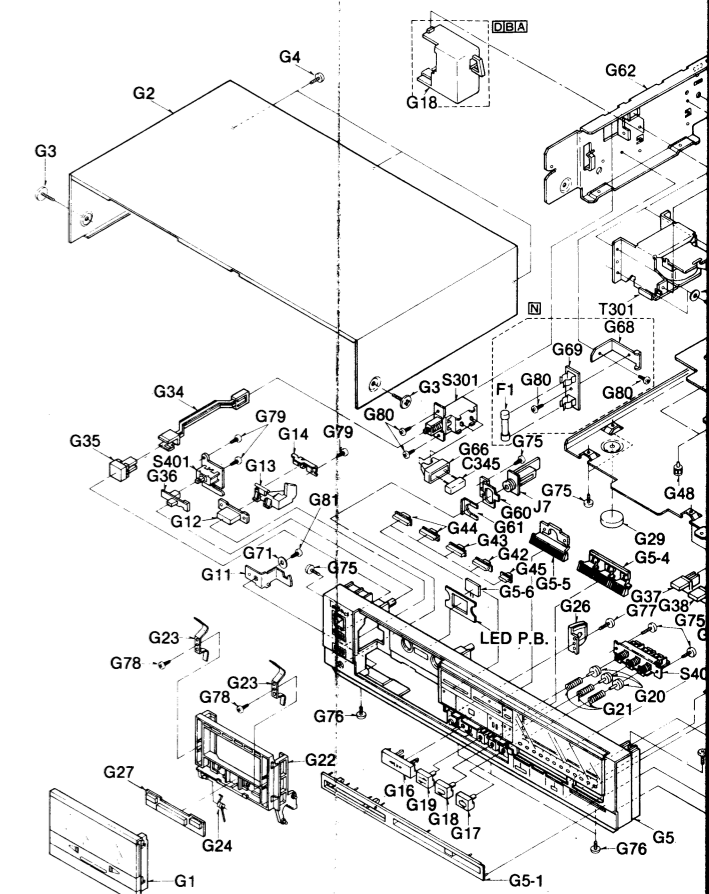


DIAGRAM

For all European areas
except United Kingdom.
For United Kingdom.
For Asia, Latin America,
Middle East and Africa areas.
For Australia.



CABINET PARTS LOCATION



Important safety notice
Components identified by  mark have special characteristics important for safety.

When replacing any of these components, use only manufacturer's specified parts.

NOTE:

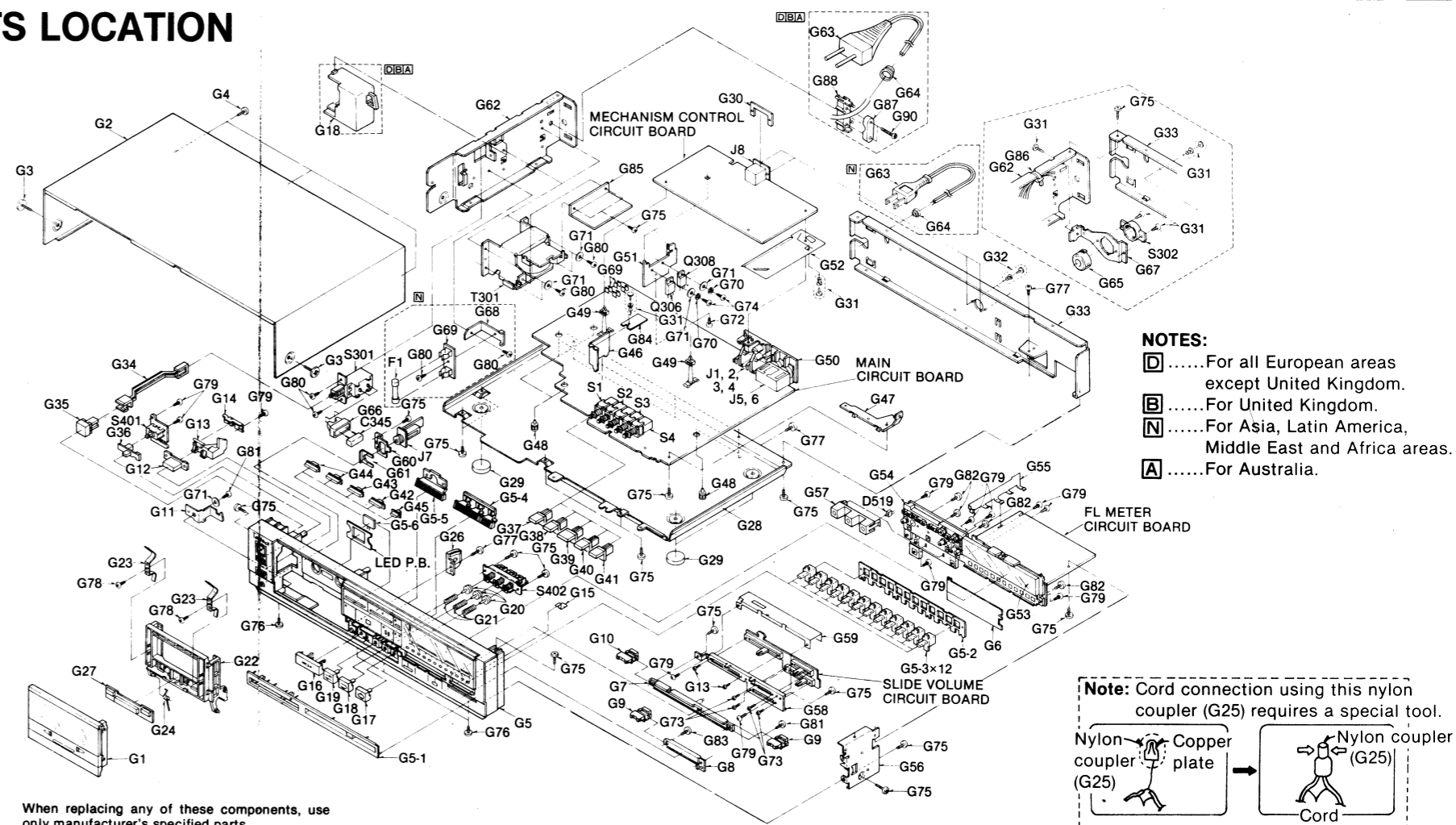
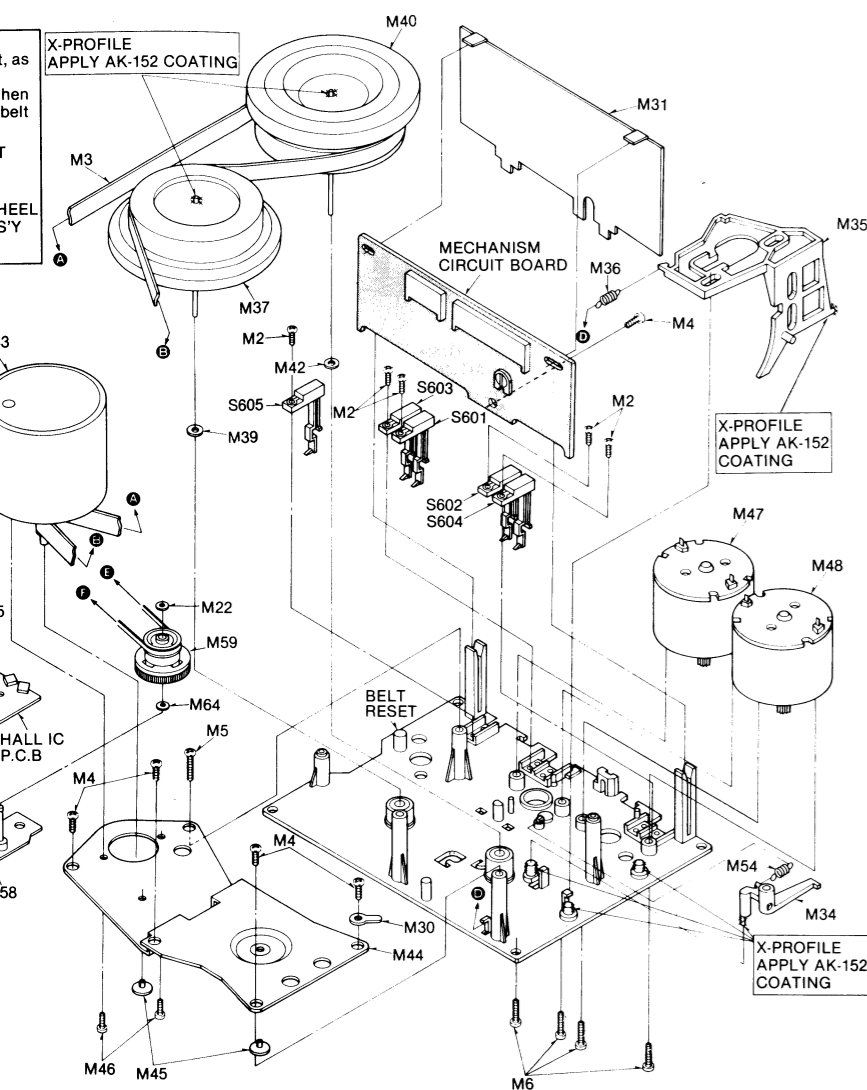
- When changing mechanism parts, apply the specified grease to the area marked "xx" shown in the drawing "Mechanical Parts Location".
- (AK-152, AERO GREASE) The grease and/or oil shown in the parentheses function to prevent friction (lubrication).

Pressure of pressure roller	400±50g
Takeup tension * Use cassette torque meter.....QZZSRKCT	50±10g·cm (FWD & REV mode)
Wow and flutter; (JIS) * Use test tapeQZZCWAT	Less than 0.1% (WRMS)

Ref. No.	Part No.	Part Name & Description
MECHANICAL PARTS		
M 1	QMA4620	Eject Angle
M 2	XTN2 + 8B	Tapping Screw $\oplus 2 \times 8$
M 3	QDB0347	Flywheel Belt
M 4	XTN3 + 8B	Tapping Screw $\oplus 3 \times 8$
M 5	XTN3 + 22B	Tapping Screw $\oplus 3 \times 22$
M 6	XSN26 + 10	Screw $\oplus 2.6 \times 10$
M 7	XTN3 + 6B	Tapping Screw $\oplus 3 \times 6$
M 8	QML4025	Change Lever

Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description
M 9	QXR0963	Change Rod Assembly	M 32	QTD1315	Cord Clamper	M 51-1	QBN1994	Click Spring
M 10	QDG1325	Sub Gear	M 34	QML4026	Obstruction Lever	M 51-2	QBP1993	Head Thrust Spring
M 11	QDG1309	Main Gear	M 35	QMR2097	Eject Rod	M 51-3	XTN2 + 4B	Tapping Screw $\varnothing 2 \times 4$
M 12	QBT2003	Eject Angle Spring	M 36	QBT1947	Eject Rod Spring	M 51-4	QBC1470	Head Spring
M 13	XTN2 + 14B	Tapping Screw $\varnothing 2 \times 14$	M 37	QXF0221	Flywheel (R) Assembly	M 51-5	QH01352	Screw
M 14	QMA4628	Mechanism Angle-L	M 39	QBW2116	Washer (2.4 ϕ)	M 52	QXK2855	Head Base Plate
M 15	QMA4627	Mechanism Angle-R	M 40	QXF0220	Flywheel (L) Assembly			Assembly
M 16	XTN3 + 6B	Tapping Screw $\varnothing 3 \times 6$	M 42	QBW2117	Washer (2.7 ϕ)	M 53	QXL1654	Pinch Roller Arm (L)
M 17	QBW2046	Washer (3 ϕ)	M 43	QXU0331	Capstan Motor Assembly			Assembly
M 18	QDR1173	Reel Table			(with Motor Governor	M 53-1	QBN1992	Pinch Roller Spring (L)
M 19	QBC1449	Reel Table Spring-L			P.C.B.)	M 54	QBT1962	Obstruction Lever Spring
M 20	QBC1450	Reel Table Spring-R	M 44	QMA4619	Flywheel Holding Plate	M 55	QXL1655	Pinch Roller Arm (R)
								Assembly
M 21	QBW2012	Washer (2.1 ϕ)	M 45	QMZ1315	Flywheel Thrust Retainer			
M 22	QBW2008	Washer (2 ϕ)	M 46	XSN26 + 3	Screw $\varnothing 2.6 \times 3$	M 55-1	QBN1993	Pinch Roller Spring (R)
M 23	XTN26 + 6B	Tapping Screw $\varnothing 2.6 \times 6$	M 47	QXU0332	FF/REW Motor Assembly	M 56	QDB0253	Pulley Belt
M 24	QWY2148YC	Erase Head (FWD)	M 48	QXU0333	Drive Motor Assembly	M 57	QZE0063	End Sensor
M 25	QWY2148W	Erase Head (REV)	M 49	QXG1076	Center Gear Assembly	M 58	QXA1432	Magnet Pulley Angle
M 26	QBC1448	Erase Head Spring	M 49-1	QDG1307	Center Gear	M 59	QXP0632	Magnet Pulley Assembly
M 27	XSN2 + 18	Screw $\varnothing 2 \times 18$	M 49-2	QBW2007	Washer (2.5 ϕ)	M 60	QML4078	Switch Lever
M 28	QH01364	Cup Screw	M 49-3	QBH0151	Spacer	M 61	QBN2030	Switch Lever Spring
M 30	QJT0015	Lug Terminal	M 50	QBT1742	Head Base Plate Spring	M 62	QMH2107	Wire Clamper
M 31	QTW1342	Insulator Sheet	M 51	QXV0195	Rotary Head Assembly	M 63	XTN26 + 8B	Tapping Screw $\varnothing 2.6 \times 8$
					(Record/Playback Head)	M 64	QBW2059	Poly Washer $\varnothing 2.1$
						M 65	XTN26 + 4B	Tapping Screw $\varnothing 2.6 \times 4$

CABINET PARTS LOCATION



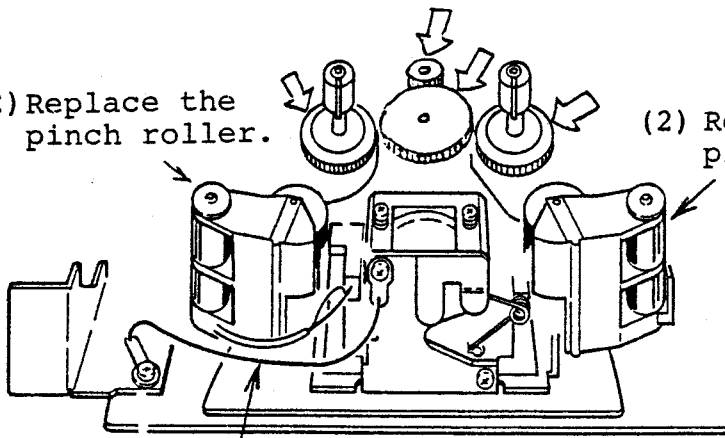
REPLACEMENT PARTS LIST

Important safety notice

Components identified by Δ mark have special characteristics important for safety.

When replacing any of these components, use only manufacturer's specified parts.

Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description
CABINET PARTS											
G 1	[N] QYF0692	Cassette Lid [For Asia, Latin America, Middle East and Africa areas.]	G 7	QGL1190K	Meter Filter	G 27	refer to D622—626	ATS/Direction L.E.D	G 63		
			G 8	QG0227	Slide Guide-A	G 28	QGC1247	Bottom Cover		[D] Δ SJA88	AC Power Cord
	"Silver Type"			QG0229	Slide Guide-B	G 29	QKA1094	Case Foot		[For all European areas except United Kingdom.]	
	[N] QYF0692K	Cassette Lid		QG0229K	Slide Guide-B	G 30	QMA4645	Remote Control Angle		[B] Δ QFC1205M	AC Power Cord
	[For Asia, Latin America, Middle East and Africa areas.]		G 9	QYT0657	Slide Knob-A Assembly (Output/Balance)	G 31	QKJ0609	Nylon Rivet-A		[For United Kingdom.]	
	"Black Type"			QYT0658	Slide Knob-B Assembly (Input)	G 32	QKJ0661	Nylon Rivet-B		[N] Δ RJA52Z	AC Power Cord
	[D][B][A] QYF0702	Cassette Lid	G 10		Holder Angle-L	G 33	QMK2130	Back Chassis		[For Asia, Latin America, Middle East and Africa areas.]	
	[For all European and Australia.]		G 11	QMA4626	Eject Button	G 34	QMR2059	Power Switch Rod		[A] Δ QFC1208M	AC Power Cord
	"Silver Type"		G 12	QGO2306	Eject Lever	G 35	QGO2142	Push Button (Power ON/OFF)		[For Australia.]	
	[D][B] QYF0702K	Cassette Lid	G 13	QML4063	Eject Lever Spring	G 36	QGT1642	Timer Switch Knob	G 64	[N] QTD1129	Cord Bushing
	[For all European areas.]		G 14	QBP2007		G 37	QGO2310	NR Button-A ("C")		[For Asia, Latin America, Middle East and Africa areas.]	
	"Black Type"		G 15	QJC0064	Earth Plate	G 38	QGO2311	NR Button-B ("B")	[D][B][A] QBJ1425	Cord Bushing	
G 2	QGC1245	Case Cover	G 16	QGO2309	Direction Button	G 39	QGO2312	NR Button-C ("OUT")		[For all European and Australia.]	
	"Silver Type"			QGO2309K	Direction Button	G 40	QGO2313	NR Button-D ("TAPE")	G 65	QTM0026	Switch Cover (for S302)
	QGC1245K	Case Cover		QGO2315	Mode Select Button-A	G 41	QGO2314	NR Button-E ("DISC")	G 66	QTW1195	Spark Killer Cover
	"Black Type"		G 17	QGO2315	Mode Select Button-A	G 42	QGO2307R	REC Button (Red)	G 67	QMA4603	Switch Angle (for S302)
G 3	QH01349	Ornament Screw		QGO2316	Mode Select Button-B	G 43	QGO2307D	Auto Rec Mute Button (Yellow)	G 68	[N] QMA3418	Fuse Angle
	"Silver Type"			QGO2316K	Mode Select Button-B	G 44	QGO2307H	F.F/REW Button (Gray)		[For Asia, Latin America, Middle East and Africa areas.]	
	QH01349K	Ornament Screw		QGO2317	Mode Select Button-C	G 45	QGO2346	Repeat Button (Gray)	G 69		
G 4	XTB3+8BFN	Tapping Screw ⊕3×8		QGO2317K	Mode Select Button-C	G 46	QTS1635	Shield Plate		[N] Δ QTF1056	Fuse Holder
	"Silver Type"		G 18	QGO2316	Mode Select Button-B	G 47	QMA4613	P.B Holding Angle-A		[For Asia, Latin America, Middle East and Africa areas.]	
	XTB3+8BFZ	Tapping Screw ⊕3×8		QGO2316K	Mode Select Button-B	G 48	QKJ0608	Tapping Support		[D][B][A]	
	"Black Type"			QGO2317	Mode Select Button-C	G 49	QKJ0725	Locking Support		QTF1054	Fuse Holder
G 5	QYP1212	Front Panel Assembly		QGO2317K	Mode Select Button-C	G 50	QKJ3355	Mic Cover		[For all European and Australia.]	
	"Silver Type"		G 19	QGO2317	Mode Select Button-C	G 51	QTH1184	Heat Sink	G 70	XWA3B	Washer 3φ
	QYP1212K	Front Panel Assembly		QGO2317K	Mode Select Button-C	G 52	QTS1629	Shield Plate-B (for Mechanism Control P.B)	G 71	XWG3	Washer 3φ
	"Black Type"			QGO2317K	Mode Select Button-C	G 53	QSiFM008F	FL Meter	G 72	XS83+6FZS	Screw ⊕3×6
G 5-1	QKG3467	Ornament Plate		QGO2317K	Mode Select Button-C	G 54	QMK2100	Operation Chassis	G 73	XS2N+3	Screw ⊕2×3
	"Silver Type"		G 20	QMB1429	Button Bushing				G 74	XS3N+8S	Screw ⊕3×8
	QKG3467K	Ornament Plate	G 21	QBC1473	Button Spring	G 55	QMA4741	P.B Holding Angle	G 75	XTB3+8BFN	Tapping Screw ⊕3×8
	"Black Type"		G 22	QYF0697	Cassette Holder	G 56	QMA4740	Side Angle-R	G 76	XTB3+10BFN	Tapping Screw ⊕3×10
G 5-2	QMF2327	Button Retainer Plate		"Silver Type"	Assembly	G 57	QKJ0683	LED Holder	G 77	XTB3+12BFN	Tapping Screw ⊕3×12
G 5-3	QGO2344	D.M.S ([1]—[12]) Button		QYF0697K	Cassette Holder	G 58	QMA4742	Volume Angle	G 78	XTN26+5JFZ	Tapping Screw ⊕2.6×5
G 5-4	QGO2308	Function Button		"Black Type"	Assembly	G 59	QTS1625	Shield Plate-A (for Slid Volume)	G 79	XTN26+6B	Tapping Screw ⊕2.6×6
G 5-5	QGO2345	Counter Reset Button	G 23	QBP1925	Holder Spring						
			G 24	QBN1961	Eject Spring						
G 5-6	refer to D335	Mechanism Illuminate L.E.D	G 25			G 60	QMA4614	Headphones Angle			
						G 61	QMA4624	Headphones Holding Plate			
G 6	QGL1190	Meter Filter	[D][B][A] QJT1079	Nylon Coupler		G 62	QMA4679	Side Angle-L			
	"Silver Type"		G 26	QYF0627	Dumper Gear Assembly						

Nr.: 318	Datum: 25. Februar 1985 WK/MM	4/85
THEMA	TEXT	
RS-B 58 R RS-B 78 R Statik-Geräusche	<p>Symptom: Beanstandung von lauten Knackgeräuschen bei Wiedergabe im Abstand von 3 - 10 Minuten oder Knistergeräuschen.</p> <p>Grund: Während z.B. der Heizperiode oder geringer Luftfeuchtigkeit kann es vorkommen, daß laute Knackgeräusche bzw. ein Knistern hörbar wird bei der Wiedergabe. Statische Aufladung bzw. Entladung entstehen beim Bandtransport:</p> <ul style="list-style-type: none">a) A/W-Kopfb) an der Bandandruckrollec) Vermittlungsrädchen <p>Abhilfe: 1. Lt. Skizze eine Drahtverbindung herstellen.</p> <p>2. Erneuerung der Bandandruckrolle durch die geänderte Version ET-Nr. pinch roller links QXL1809 pinch roller rechts QXL1808</p> <p>3. Fetten der Vermittlungsrädchen ET-Nr. QZZ0118</p>	
Zu Nr. 2 pinch roller links QXL1809		
pinch roller rechts QXL1808		
Zu Nr. 3 QZZ0118	(1) Add the Lead wire	
Panasonic Service Deutschland GmbH		